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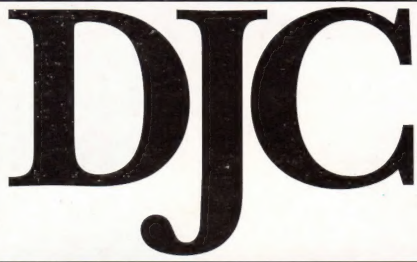


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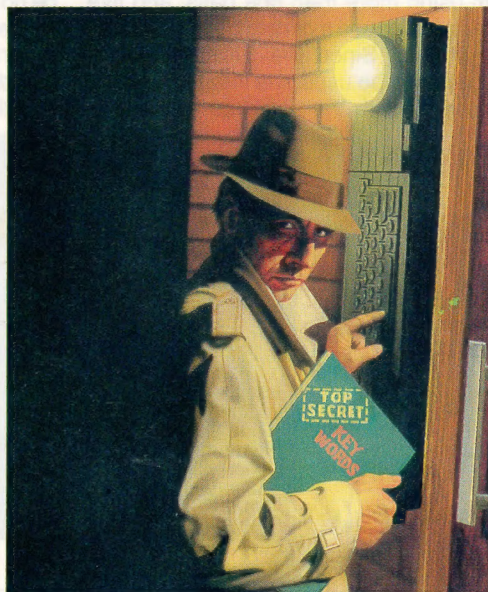
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NEXT MONTH

As well as our regular features, waiting for the off we have a review of PROSPERO PASCAL for programmers, PART 5 for followers of database DBQL, the second instalment of SYSTEMATIC MACHINE CODE PROGRAMMING, a ONE MAN'S SYSTEM about Archive, lots of reviews and some programs.

T A R O U B L E

Digital Precision are pleased with the initial reaction to their new word-processing program, *Perfection*. There have been quite a few complimentary letters from proud new users. What criticism there has been appears, mostly, to relate to misunderstandings about the use of the program. As with almost any program, there will be many second thoughts after the initial release, some resulting from user feedback, others from the producers' own experiences during long-term use of the program. It is something of a truism in the micro world that no program is fully functional until version 3, but *Perfection* works well at version 2.

One thing that confused me was the mechanism for saving SuperBasic files. There is no problem loading them – just use the normal Load command – but the fact that they are 'plain text' means you cannot use the Save command if you want the SB program to run. Using the Export File command is the answer, but it may not appear to be so in some circumstances. If changes are made to the file, but the ENTER key is not used during the making of them, all should be alright. However, use of the ENTER key introduces a code into the file which will prevent subsequent running of the SB program. You can see if codes are present by using CTRL-H to display them. The remedy is simple – switch the Line Wrap function off before loading. Additional comment on this is likely to be put into updates to the instructions.

Cut and Paste

One function which seems to be missing from the QL utility scene is a routine for doing Cut and Paste operations on text, from program to program. For example, copying a database record complete with format from, say, *Archiveto text*⁸⁷ while both programs are loaded in the QL, during the same session. *Flashback* can do the paste part, but it really needs a program which 'sits above' the other programs to be able to both cut and paste. This is done in various forms on the PC and could presumably be implemented on the QL too. The 'ideal' form is where the two programs are linked, so that the required section is actually copied from program to program, and any alteration in the original data is reflected in the copied data, in the other

Bryan Davies tries out *Perfection*, and Phil Borman's SUB routines

This program. This function has come to be called DDE (Dynamic Data Exchange) and must be something many users have dreamed of. A much simpler, but generally adequate, method is to copy the screen and transfer that. This works well when the screen contains text, but is not good for graphics. The mechanism is to make the source program the current job, activate a Mark function, and use the cursor – now tied to the supervisor program – to mark an area of text, by pressing ENTER at top left, then bottom right. You then switch to the target program, call up the supervisor program, and direct it to transfer the marked screen area. The text from the marked area then appears at the cursor point, and is inserted character by character, rather like being typed in; it looks very much the same as entering text from an ALTKEY, KeyDefine, or such.

My problem with printing on a laser printer from *Professional Publisher* now seems to have vanished, without the reason being apparent. Printing a full page from 1- to 3-pass, is now successful; the output is no longer spread over several pages. One possible reason is that the printer may previously have been set to Landscape instead of Portrait. On the laser, there doesn't appear to be anything to be gained from using more than one pass, and five passes still cause a print to be spread over two sheets. Since the FX80-emulation mode has to be used, the image quality is generally much the same as with a dot-

matrix printer, although it should be appreciably better on areas of solid black.

While on the subject of printing, another improvement in my screen dumps has come about through a little more reading of the Trump Card instructions. The Epson GQ-5000 laser can emulate the LQ-2500 24-pin dmp, and it seemed reasonable to try the toolkit command <SDP_SET 6,3,0,0> for selecting the printer type and resolution. The resolution for these settings is 180 dots/inch (maximum for the laser is 300) and 180 lines/inch. The improvement in screen dumps was quite marked. The horizontal white lines we normally have to put up with in all-black areas are gone (see the illustration of a *Perfection* screen). Apart from using the LQ-emulation mode, the printer was set to print Landscape, to avoid the edges being chopped off the image. How applicable these settings are to other users' printers is another matter. If you have a GQ-3500 or -5000, or an actual LQ-2500, or something that can – or might – emulate it, it's worth a try. The dumps can take a long time though. The previous best settings for my 9-pin dmp were <SDP_SET 1,3,0,0>, which are for the Epson MX80 'or similar'; the resolution for this is 120 dots/inch and 72 lines/inch.

SUB for hard disk

The collection of utility routines for hard disk assembled under the heading of SUB by Phil Borman of Quanta is proving very useful with the Miracle hard disk. It would be no exaggeration to say they have transformed operations with the drive. Several programs can now be run, from their own sub-directories, using a further level of sub-directories for their data files. Switch-

A sample screen from *Perfection*.

```

1991 Aug 02 08:31:52 [caps off / memory = 323872]
F1 HELP F2 Menu on screen SHIFT F2 Mode8 ++ SHIFT F3 one/two - + SHIFT para/word
F3 Menu 1+2+3+1 SHIFT F3 Menu3+2+1 windows F3 selects + SHIFT ALT window
F4 Refresh screen SHIFT F4 Size/Move ALT F5 Over/Insert CTRL toggle job

The screen dump is a very useful function, but the resulting printout can
suffer from a variety of defects. One of these is loss of some screen
colours. That particular weakness was solved with my Kaga-Tapan KP-810 DMP
by setting the dump for an Epson 1000, rather than the Epson one would
expect to be the correct choice. The complete setting used in my boot
routine for this was:
SDP_DUMP: SDP_SET 6,3,0,0
Inevitably, it seems, a 9-pin DMP produces printout with lots of
horizontal white lines splitting up the black background. A slight
improvement was obtained by using a laser printer instead of the DMP. As
the laser had to be set to an emulation mode compatible with the SDUMP
function, the improvement came only from the lack of impact marking (by
pins), the better surface texture of the cut sheet paper used (as opposed
to continuous paper in the DMP), and better density in black regions.
The dump you see here appears to be the best obtainable with my current
equipment, and is produced with the Epson GQ-5000 set to LQ-2500 24-pin
emulation mode and the SDUMP settings changed to ones for the LQ-2500:
SDP_SET 6,3,0,0
  
```


SHOOTER

M S O L V E D

ing between them involves no more than using CTRL-C – there is no need to re-acquaint each program with its default directories. Memory permitting, it is possible to run *text⁸⁷*, *The Editor*, *Quill* and *Perfection* together. With *text⁸⁷* and *Perfection*, there appeared at first to be no problem, since they can both be configured to accept device names which are long enough to allow for sub-directories. In their cases, the program directories used are WIN1_TXT87_ and WIN1_PERF_, and the data directories are WIN1_TXT87_DOCS_ and WIN1_PERF_DOCS_. The abbreviated names are used because sub-directory names are actually only file names and there can be some confusion between program files and sub-directories if the latter are called 'TEXT87' etc.

Accommodating

In practice, it was found that *text⁸⁷* would accept its directory names, but proceeded to delete the characters between the last two underscores and then could not find its data files. The other two programs are less accommodating, perhaps because they were written before hard disk was much talked about on the QL scene. As long device names are unacceptable to the configuration routines of *Quill* and *The Editor*, the default program devices were set as SUB7_ and SUB5_ respectively, and the data devices as SUB8_ and SUB6_. In view of the slight problem experienced with *text⁸⁷*, it also was treated in the same way, the defaults being set to SUB3_ and SUB4_. The SUB routine itself translates SUB1_ to SUB8_ into specified sub-directory names.

In this case:

SUB1_ is equivalent to WIN1_PERF_
SUB2_ is equivalent to WIN1_PERF_DOCS_
SUB3_ is equivalent to WIN1_TXT87_
SUB4_ is equivalent to WIN1_TXT87_DOCS_
SUB5_ is equivalent to WIN1_EDITOR_
SUB6_ is equivalent to WIN1_EDITOR_DOCS_
SUB7_ is equivalent to WIN1_QU_
SUB8_ is equivalent to WIN1_QU_DOCS_

These equivalences could be produced by making the statements:

```
SUB_USE 1, 'PERF_'
SUB_USE 2, 'PERF_DOCS_'
SUB_USE 3, 'TXT87_'
SUB_USE 4, 'TXT87_DOCS_'
SUB_USE 5, 'EDITOR_'
SUB_USE 6, 'EDITOR_DOCS_'
SUB_USE 7, 'QU_'
SUB_USE 8, 'QU_DOCS_'
```

but the SUB routine makes it unnecessary to issue these statements. The program file SUB_BIN can be configured to be aware of what SUB1_ SUB8 represent and, from there on, the user doesn't have to bother about typing-in the sub-directory names for each program. This may sound complicated, but it is much preferable to not being able to use the hard disk as a proper sub-directory device. Trying to sort out which files belonged to which program when they were all dumped together in the Root Directory was a real pain.

There are several useful commands and programs provided in the SUB collection, but it is available only to Quanta group members at present. Although I've not checked it yet, all the foregoing comments on SUB should apply equally to the high-density disks with the *Gold Card* as they have the same sub-directory structure.

The following report comes indirectly from two other users, and is not something I have been able to check yet. It is said that, when a system has both the *Gold Card* and the *Miracle* hard disk connected, the file WIN_REXT must be deleted from the hard disk. *Miracle* advise only that the file is *not necessary*, but that advice would appear not to be strong enough, as there is a risk of all hard disk files becoming read-only if that particular file is present during boot-up. The file is incorporated into the *Gold Card* rom.

There is an oddity in the instructions with the *Gold Card*, on the second sheet, where the command <FORMAT "MIRACLE*H"> is given an explanation with some surplus words in it. It will actually format a disk to high density (1.44 MB), with the label "MIRACLE".

Hardware gaps

Various Quanta members are active in trying to plug QL hardware gaps. The group itself is producing the *Qimi* mouse interface (as designed by QJump), and an

IDE interface for hard disk is under development by one member. The *Rebel* hard disk units look as though they may reappear also. The interface part of the latter would be of particular interest to people who have, or can get hold of, cheap hard drives with the standard ST506 interface, because it should be possible to connect them directly to the *Rebel* interface. Some improvements have been made to the drive software recently; from accounts of users, the drive access speed with the *Rebel* unit is higher than that of the *Miracle* unit. The IDE interface should provide much better data-transfer rates than we have seen so far, but it does not support standard ST506 drives. There are a fair number of IDE drives available on the PC market at reasonable prices, though.

With the *Qimi* mouse now seeming to have no serious competition, could it become the 'standard' for the QL? There must be a fair number of them around, from the previous sales activities of QJump, Care and Jochen Merz. One obvious problem is that *Turbo*-compiled programs are apparently not compatible with *Qimi*. This would mean that *Professional Publisher*, for instance, could not utilise the *Qimi* mouse properly. This is perhaps the most important program in need of a standard mouse interface; it can be used with the *Smiling Mouse*, but there are not many of them around. It will also be important for *Qimi* and the *Gold Card* to be fully compatible; one would expect *Qimi* owners to be likely buyers of both the *Gold Card* and *Professional Publisher*. *Miracle* have recently made changes to the *Gold Card* rom to avoid possible trouble with *Qimi* interface. The borrowed GC I am using at the moment works alright in two of my QLs but not in the owner's QL with *Qimi* installed; there have been problems which appeared to be traceable to the *Qimi* installation previously, so some further experimentation is called for, and a later rom may be fitted to the GC shortly also.

It was encouraging to find that a particular JS QL, which locks up within about 20 minutes when a *Trump Card* is installed, doesn't seem to be having any trouble with the *Gold Card*, during all-day sessions. How touchy some of our machines are. . . It would suit me if the JS could be put back into use again (it went into a drawer once the *Trump Card* made it unusable), as the JM that has been used since then causes

TROUBLESHOOTER

quite some extra work during program-review sessions. There are a few features of the JM which don't matter in normal use but which bring work to a halt fairly often when new programs are loaded after the system boot has been run. It may be that some of the stoppages are caused more by careless programming than by the Qdos version. One regular fault is for a programmer to use a runtime Turbo toolkit without bothering to make sure the version of it that is supplied is compatible with the version of Turbo used during compilation of the program.

The chances are that a program was developed on a JS (JSU if written in the USA), and never checked on a JM, and something that can be got away with on the former causes a halt on the latter. Try this boot for size – can you spot why it doesn't run on a JM with Trump Card but runs without murmur on a JS with Gold Card?

```
WINDOW #0,480,23,15,229:BORDER
#0,1,7:PRINT #0,">>> One moment...":
SDP_KEY'p':SDP_DEVSER1:SDP_SET
6,3,0,0:
_base=RESPR(5632):LBYTES
flp1_RUNTIME_EXTS,_base:CALL
_base:
PAUSE 100:CLS#0:PRINT #0,">>> Load-
ing 3D_TERRAIN...":
LINK_LOAD "PLOT","PARAMETERS",
"SHAPES","LIBRARY":END_CMD
```

In the boot file, this is actually one end-

less line or commands, with everything – apart from what is shown above as the second line – being in the original boot file. In the original form, the boot runs on both JS and JM, but the apparently-innocuous set of three commands to permit dumping of the screen cause the message 'bad name' to appear when the modified boot is run on a JM; on a JS, it still runs normally. Using the NEW command after the runtime extensions have been called, then typing-in the remaining commands, solves the problem.

Suppliers' letters

Note the change, for this month only. As I haven't had my next batch of readers' queries yet, but a bundle of letters has arrived direct from DP, it seems sensible to report a few comments from the other side of the fence. Summed up, what DP is saying is: 'Why don't customers check what they did when they placed an order, before complaining about non-delivery of the goods?' The mistakes made by customers when placing orders look easy to spot – afterwards – but we all have our blind spots when re-reading what we have written:

- 1) Incorrect supplier address. In DP's case, the obvious mistake is putting "22" instead of "222" in the street address.
- 2) Failing to put your own address on letter or envelope.
- 3) Not giving *all* the digits of a credit card number.
- 4) Not specifying the size and format of

5) Calling and not leaving a message on the answerphone (then complaining that nobody called back!).

It's worth noting here too that the *QL World* editorial office often receives enquiries, changes of address or even cheques from subscribers who don't quote their subscriber numbers, and which would in any case have been better sent directly to QLW's subscription agent (see the small print on page 3).

If he has not written again, perhaps the customer who wrote to DP from Spain on 9th July about a problem using a 24-pin printer with *Professional Publisher* would contact them again, and give his name and address this time. In regard to his printing problem, it may be caused by his new Epson printer not being compatible with his old Epson one; specifically, it may use increments of 1/180 inch instead of 1/216 inch when up-spacing. The measurements of his two samples show the 1.2:1.0 line spacing one would expect from this, although the actual characters are larger too. Don't expect all Epson printers to be 'Epson compatible'. My Epson laser printer has two emulation modes for other Epson printers, as well as its 'native' mode, because Epson chose not to make newer printers completely compatible with the old FX80. For instance, the LQ-2500 can print in 9- or 24-pin mode, and it may be compatible with the FX80 in 9-pin mode, but it certainly isn't fully compatible in 24-pin mode.

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Now you can keep your Sinclair QL World magazines safe and clean. No more dog-eared covers or missing copies . . . You can protect your magazines in this high quality, specially-created binder. This Sinclair QL World binder will comfortably hold a complete year's issues of your favourite Sinclair magazine. It is a high

quality product, British-made and comes with full binding instructions. It is manufactured in a rich, deep blue with genuine gold blocked lettering. Enhance your Sinclair QL World Magazine collection now for only £5.95 (inc.P&P!) *Send for one today!* The QL World binders also make an ideal gift for other Sinclair users too!

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PERFECTION PERFECTION PLUS

NEW!

DIGITAL PRECISION LTD

Not just a word-processor - this one is THE word processor. From the same inspired team who brought you classics like LIGHTNING SPECIAL EDITION and PC CONQUEROR, Digital Precision presents a product that will revolutionise the way you use your QL. Let us tell you how PERFECTION will do this.

Several hundred thousand QL users have grown familiar with the free word processor that was bundled with the QL. On the plus side, its use could be mastered in a few minutes, thanks to its simple menu system, and it is reasonably WYSIWYG (What you see is what you get) in appearance. On the minus side, it is very slow, sometimes idiosyncratic (in what it prevents you from doing, or the roundabout way in which it forces you to go about things that should have been straightforward) and very many commands that we think should have been provided with it simply weren't. Valiant attempts to accelerate it by 'patching' it have achieved only a 20% speedup.

There is, however, no getting away from the fact that the majority of QL owners still use Quill as their main program. They have grown used to the user interface of the bundled programs, and are reluctant to invest time in learning some totally incompatible system, whatever its claimed advantages might be. So - using their ingenuity, for QL people are an ingenious tribe - users have put up with the inadequacies and slowness, and enjoyed Quill's friendliness.

You are probably just such a QL user yourself....

Now here is a product CREATED JUST FOR YOU.

A word processor that you can master in just a couple of minutes. A word processor whose user interface uses precisely those keys that you would expect it - from intuition or experience - to use.

A word processor that is menu-driven (multiple page menus) so there is absolutely no need for you to remember anything or even refer to the manual: the menu is on the screen all the time. A word processor that is intuitively obvious to operate: even more obvious than was the bundled one. If you have become at all used to the F3 interface, you will love this enhancement! A word processor that is designed for Absolute Beginners and Advanced Users, for Complete Wallies and for Albert Einsteins alike.

A word processor that is so powerful that it can handle letters and documents of but a few pages as well as for articles, journals, magazines, books, theses or manuscripts hundreds of pages long. A word processor that can unleash the power of your printer, whatever its make, and squeeze the very best from it. A word processor with a very flexible user-configurable printer driver: one, however, that you should never have need to configure(!), as it works as shipped with Epson-compatibles and most non-compatibles, and if you have an esoteric printer, it can utilise your existing configured Quill printer data file, automatically, if you want it to! With this word processor you do not have to buy any extra printer drivers - you get everything you need right from the start.

A word processor with full on-screen indication of character mode bold (i.e. emphasised) appears bold on screen, underline appears underline, italics appear in italics, superscript and subscript appear superscripted and subscripted. Other "special" type modes - dependent on the capabilities of your printer, like switching fonts, pitches, NLQ/draft mode, proportionality, double-strike, or anything else you choose - are indicated on screen by variations in ink/strip colour combinations, just as the most advanced PC word processors do. You can even make up your own attributes to display on-screen in a particular ink/strip. Combinations of attributes are permitted - the display copes fine. Never before have things been so clear and simple....

That PERFECTION manages to do all this is remarkable. That it manages to do it at all fast would be amazing. But the truth is, in fact, much much better. PERFECTION is by far the fastest word processor on the QL, by times faster than Quill on many operations (a minimum of five times faster than it on everything), and - yes - many times the speed of our own beloved and excellent Editor, and far far ahead of all the others.

This may seem impossible to you. Two years ago, before we started work on PERFECTION, it would have seemed impossible to us as well! But a remarkable bit of software technology has enabled us to achieve incredible acceleration. Of course you don't need to know or understand how we have accomplished all this in order to enjoy to the full the benefits of PERFECTION speed: if you want to know anyway, look at the technical section later on. If you already use Quill or ANY OTHER QL WORD-PROCESSOR, you will be overjoyed to know that PERFECTION can load your existing saved files (.doc or .lis or ASCII) directly, with no conversion process required. This is together with the great advantage of an existing printer driver data - takes the trauma out of the move to an exciting new system! And PERFECTION files are usable with PC/ST/Amiga word processors too.

PERFECTION comes with a multi-function configurator that allows you - if you want - to tailor-make a version specific to your tastes. Practically everything that is settable at run-time is also pre-configurable, making PERFECTION comfortable to operate. As you become more familiar with PERFECTION and longer need the menu options to be visible all the time, you can toggle the menu off, freeing all the screen for your document. You can configure PERFECTION so that on startup the menu is either visible or not. As you become even more familiar with PERFECTION, you can opt to bypass the menu system entirely, and use alternative direct keypress commands to access PERFECTION's power even more rapidly.

PERFECTION natively multitasks (of course) which means that without any other tools you can run multiple copies of it simultaneously, as well as run it at the same time as other pieces of software. Even if you choose to run only one copy of the program, you still have the option to look at more than one part of the document at the same time. You can take a "snapshot" of part of the document, and keep that snapshot in view as you edit a totally different area of the document. Ideal for indexing or cross-referencing. You can set up macros so that making a glossary is easy. Also, you can have any number of blocks - not just one - defined in the document. You can undo/edit attribute changes with a single keypress - there's no need to laboriously "paint" over areas or navigate to the start and end of a highlighted area in order to adjust the attribute. Being able to cope with human error is an important part of PERFECTION philosophy. For example, not only is there an Undo option, but you can also ESCape from any command. When you have right justification on PERFECTION will add pseudo-spaces to pad out the line. Pseudo-spaces look like spaces and print like spaces but when you left justify they are removed while real spaces - the ones you have entered via the SPACE bar or TAB) are not. This means if you accidentally right-justify a line of columnar data, a simple left-justify will get it back to its exact original state. Most other word processors do not distinguish between spaces you have entered and spaces they have inserted, and hence cannot auto-recover.

Many users need the use (sic) of a spelling checker with their word processor. Adequate spelling checkers already exist for the QL, and for users who either do not want a checker, or who do not want one as yet, or who already have one and are on a tight budget, we supply a version of PERFECTION without any built-in checker. But to get the best out of PERFECTION, we also supply it bundled with a dedicated Spelling checker of unsurpassed speed. There are even two levels of dictionary supplied (you get both) - the larger one is 225,000 words (no more hassle of having a checker in which doesn't know the words you use: this dictionary is about 400% larger than its nearest competitor!) and a compact one: use the latter if you are short of memory, or when your document is really huge. You can add new words to the dictionary as well as create new dictionaries. With either dictionary PERFECTION PLUS one checks as you type, or checks saved files, or - BEST OF ALL - spell-checks interactively from any one document to another.

If you already have our Editor Special Edition and use it for documents, database work or programming, you will find PERFECTION a wonderful treat. PERFECTION's WYSIWYG behaviour, greatly enhanced document facilities ("tells you everything" status line, available word/line/character counts, regular and forced page breaks, headers (and footers)), menu-driven options and VERY MUCH

GREATER SPEED make it an ideal upgrade. There are hundreds of detailed changes - to give but one: paragraphs do not need to have a blank line between them in order to distinguish them any more. There remains an area, however, where Editor Special Edition remains supreme - the editing of "non-printable" data, the ability to handle the entire ASCII character set from codes 0 to 255. So if you are a technical or semi-technical user and do not have either Editor Special Edition or PERFECTION, your best buy is the two programs together (they can interact, coexist, work simultaneously and have fully-compatible file formats). You will then get Editor Special Edition at HALF PRICE (Special Offer - limited duration).

The characteristics of a good database are its ability to Store, Retrieve and Manipulate information rapidly. By this criterion, this word processor makes an ideal database system too, as it is blindingly fast and flexible. Forward and backward 'Search' takes at most a couple of seconds, even when you have a document that fills an 896K Trumcard system to the brim! Cursor navigation is also unbelievably fast and smooth, with an accelerating rate of scrolling if you indicate impatience. And there are macros, programmability and more for the more advanced user. If you have been unhappy with the speed or complexity or non-programmability of your existing database, PERFECTION will solve your problems. PERFECTION can even access your existing Archive export files.

And if you want full desktop publishing capabilities (the use of fonts that your printer does not possess, and graphics) interlinking PERFECTION with Professional Publisher is a doddle, the result into Pro Publisher.

But first and foremost, PERFECTION is a user-friendly, familiar user-interface, stand-alone WYSIWYG dual-control (menus or direct commands) word processor of enormous power and blistering speed, which (for the first time) makes output to printers hassle-free. There is nothing else like it or even remotely as good as it on the QL or on anything else. PERFECTION is our best yet.

PERFECTION is not just a word processor, it is a word processor, are indifferent to it or love it, PERFECTION will let you forget about all the technology and concentrate only on the writing.

PERFECTION costs just £79.95 including integrated printer drivers, ancillary programs and Jargon-free, friendly but to-the-point documentation (that you will probably never need to read through!). PERFECTION PLUS comprises PERFECTION plus the dedicated Spelling checker with dictionaries and costs just £119.95.

TECHNICAL INFORMATION ON PERFECTION

You don't actually need to read or understand this.

PERFECTION gets its superb speed from two sources. Firstly, PERFECTION is unlike virtually any other word processor - is written entirely in 100% hand-written machine code. This gives us a considerable speed advantage over compiled alternatives. Had we written PERFECTION in a high level language it would have been 4 times slower, 6 times bulkier and taken us a great deal less time to produce. You reap all the benefits of our hard work. The other source is design. There are two formats for internal data storage for character handling programs. Many store data serially in a long stream of characters. Ones like Editor store data as lines scattered through RAM in a table of pointers to the lines - a far more advanced method. The first format has the advantage that it is cheap to program - the user pays the cost in terms of performance, with sluggish block-defining/moving, navigation and insertion. The second format has advantages including instant random access to any line and quick insertions and deletions - the disadvantages may include heap fragmentation that will result from repeated grabbing of small chunks of space (garbage collection may be required periodically if space is short). Both formats share the disadvantage that "global" changes made to a part of the document - say a switch to bold at the top - will take a long time to filter down through the system to become visible on-screen at lines at the bottom.

PERFECTION uses a variant of the second format that does not have its disadvantages. Data is stored in RAM in optimised sized chunks - a chunk being roughly the size of several screens. Each chunk has a control information area within it about the number of lines etc within it, the display status at the start of it (say bold on, italics/underline etc off). Whenever you are editing, the relevant chunk(s) are instantly loaded into a large work area that has slack space at both top and bottom. That means that you that you can do a great amount of editing without PERFECTION having to bother about updating anything but the work area. Only when you move over the edge of the work area will PERFECTION need to housekeep outside the work area: the housekeeping itself is then very very fast, as only control information areas need to be updated. There is no need for a general scan through all following text. There are many more speed and power advantages to our system. There is one big disadvantage - it is an absolute nightmare to design and implement! Fortunately for you, you don't have to know anything about it - it just works like clockwork, automatically and behind the scenes.

Other elements of PERFECTION design to enhance performance include lazy screen (when you keep a key pressed in order to get somewhere, the whole screen updates) and lazy attributes (when you scroll the line your cursor is on) and lazy attributes (when in a huge document of hundreds of pages you do a long jump - say from near the top to near the bottom, in one go, and we have not yet resolved the attribute status (say underline on) of the area you want to get to, we don't hold up the display for even one hundredth of a second while we are computing attributes, but display the new area immediately without any pause, then attributes will 'catch up' a second later; you will see this if your document is very very big and you navigate in huge leaps). Also, there is a garbage job running all the time in the background, doing whatever internal tidying up and optimising is needed when you are not doing anything (with PERFECTION's speed, even if you are typing at 200 wpm the program is sitting twiddling its thumbs 90% of the time as it awaits input!). Consequently, PERFECTION's internal tables are always in a PERFECT state. Both lazy screen and cursor acceleration are user-configurable, incidentally.

There are dozens of other more localised ways in which PERFECTION performance is obtained. For example, PERFECTION has built-in knowledge of statistical distribution of occurrence frequencies for the various alphabetic characters in English and other European languages. This data is used as follows: if you ask PERFECTION to search for the word 'praxis' in your document, we won't look for the 'p' first. Instead, we automatically look for an 'x' (less occurrences of 'x') and having found 'x' then resolve whether it is embedded within an occurrence of 'praxis' (if not, we search for another 'x'). Obvious? We thought so. But no one else appears to be using this excellent trick. Or dozens of other tricks that we'd prefer you to keep to yourself.

For those with advanced needs, PERFECTION features include full programmability - more than just macros - with the ability to save and re-execute programs. There are over a hundred commands. You will be relieved to note that PERFECTION's file format is very clean, containing one short header (giving the margin/TAB etc data for that document) and then exactly what you typed in (no mass of pointers or cursors). Changes of attribute bold NLQ, underline etc that you have opted for are stored as control characters (we document the structure) in the appropriate places in the file - note that while the control characters themselves (as opposed to their effects, which are WYSIWYG'd on-screen) are invisible when you are viewing the file, you can edit/delete them (search for the next or previous bold text, say) and even program the access to them (swap all bold for double-strike plus underline). You can even opt to Export so that the text is suppressed, to enable its direct use as a programming or technical front end, or to allow its output to be read in by other word processors (QL, PC or whatever).

The net result of all this is that in terms of features and performance, PERFECTION running on a QL will beat most word processors even running on state-of-the-art £7000+ 486 PCs... In a nutshell, PERFECTION will blow your socks off.

LIGHTNING SPECIAL EDITION LIGHTNING

Until the autumn of 1989 the fastest way of speeding up your QL display was to buy Lightning, which greatly accelerated QL text printing, graphics and maths, without affecting compatibility at all. Now you can buy Lightning Special Edition, which is significantly faster than Lightning and does a lot more! Lightning Special Edition is simplicity itself to use. Once it is loaded ALL programs will AUTOMATICALLY benefit from the enhancements it provides. If you are using a QL without Lightning you are probably a little pale (quote from John Norton of Sector Software), you should get out and about more... Go to some QL shows or meetings where you will see Lightning in action - or take our word for it. If you don't have Lightning you are WRONG. Lightning Special Edition works by automatically (I know we keep using the word, but it is the only one that is really correct here) and instantly replacing QL ROM code (or Minerva code, for that matter - Minerva and Lightning complement each other superbly) that has usually been optimised for space, with extremely high speed routines written by us that do the same job but much faster. Screen output speed gets accelerated by factors from over 1.5x to over 10x (about 2x-4x is representative), graphics are drawn twice as fast (points are plotted 5 times faster) and internal maths is speeded up by 2x-5x (you can even vary the precision). There is virtually no cost in RAM (for example, you can still run Quill with a fairly large document on an unexpanded QL with Lightning Special Edition). The Special Edition is supplied on EPROM plus disk/cartridge: if you already have something precious plugged into the QL's EPROM socket (at the rear), there is no problem - all the EPROM's functionality is duplicated on the other medium! Lightning Special Edition provides more than acceleration - you can dynamically adjust channel parameters - like ink, paper, font, screen position, use over 80 fonts, a null device, a character driver and all sorts of other interesting gadgets. Lightning Special Edition installation has been totally automated, and will not present you with complications no matter how computer-naïve you are. If you cannot afford the Special Edition, get Lightning. Refer to its review in September 1988 QL World to see how effectively Lightning acquitted itself. Both of these programs transform the QL into an altogether more zippy, business-like, efficient, enjoyable machine.

PC CONQUEROR WITH DR-DOS v5.0 PC CONQUEROR

Terrific though we know the QL to be, we do feel the pressure to be "PC compatible" in today's world. There is increasing demand to be able to bring home and run the programs we use at work (or the other way around!), and to have access to the vast storehouse of PC software: word processors, databases, spreadsheets, expert systems, accounts and financial modelling packages, vertical market applications, visualisation aids, graphics/CAD/PCB designers, languages/compilers, operating systems, environments, utilities, adventures - you name it, there are scores of each type readily available for the PC. And thousands of shareware/PD programs too, most for the cost of a blank disk plus postage. If you buy PC Conqueror, you will be able to run these programs! To boot up PC Conqueror takes 10 seconds from the F1/P2 prompt: thereafter, your QL is a HIGHLY compatible PC clone (indeed, more compatible than some "real" PCs). Conqueror is all-software. There is no comparison in quality between Conqueror and its predecessor: Conqueror has ALL the features of Solution (read the details later in this ad if you are unfamiliar with Solution's legion facilities), but is almost TWICE as fast: this has come about by our careful rewriting and optimising of Solution's code. As if the colossal speedup was not "enough", Conqueror (unlike Solution) runs perfectly even with PC software that makes various "non-legal" use of the operating system. Conqueror runs with virtually anything that will run on a PC. QL Worlds (December 1989 to March 1990 listed several hundred PC programs/utilities found to work with Conqueror. It is simpler to say that we have yet to find a program that runs fine on a standard PC that doesn't run with Conqueror: we are aware, however, of programs that will run with Conqueror but won't run on some PCs! The problems of detecting when the QL screen has been changed, we need not slavishly update the screen many times a second (taking precious time away from the main PC-emulation job) as did Solution. Instead, we update the screen instantly it needs to be updated. This simple to understand but very hard to implement modification gives Conqueror additional (over and above what we've already discussed) "scalable" acceleration, as well as absolutely smooth echoing of keyboard input to screen (Solution could be a bit jerky when you typed quickly).

Conqueror's new features include a more flexible configurator and a better diagnostic and supervisor option, an enlarged manual (Conqueror itself is more compact!) with a troubleshooting chart, and a new mode of operation (in addition to the "normal" one of reading/writing PC disks directly) which allows you to create mini PC environments - you select the system, location and name on any QL device (including floppy, ramdisk, hard disk and even mdv) which look like files from DOS (and can therefore be copied with SuperBASIC's COPY!) but are indistinguishable from PC drives from within DOS (Conqueror works with all versions of DOS). If you do not have legal access to a copy of DOS, you need to buy DOS too (DR-DOS or MS-DOS) - but we sell the complete DR-DOS (with Viewmax, Shell, Cache and system utilities) at c. 1/2 price! Of course QLs are better than PCs, but QLs that are PCs well are better still. We will leave the last word to people who have already bought Conqueror. All these sentiments are unsolicited. "I wish to congratulate you on the excellent work you have done on Conqueror. The improvements in performance over Solution are astounding. Well done!" B.C. Papageailj, Netherlands. "I am highly delighted with this new emulator. (Apart from the speed-up) it also appears to be more tolerant." L. Chandler, Peterborough. "Congratulations on bringing such a fast PC emulator into the world - on it, even Wordperfect runs at a reasonable speed." R. Williams, London. "I'm impressed with the improvement in speed over Solution." P. Vervoort, Netherlands. "Thank you for your prompt service. I have Conqueror up and running, and congratulate you on an excellent piece of software." G. Leagas, Hartlepool. "On some benchmarks almost as fast as a PC." P. Johnson, Stoke on Trent. "Conqueror is still a whole lot faster (even) without Lightning than Solution is with the assistance of Lightning." P. Christie, Glasgow, who went on to praise Conqueror for running software Solution couldn't handle. "Conqueror, to which I upgraded from Solution, is a delight to use by comparison!" B. Gouldwell, Dunipace. V. Pakanen, Finland sums it all up rather well with - simply - "Excellent."

PROFESSIONAL PUBLISHER

To show you a little of what our Professional Publisher can do, we have prepared our last advertisement using it. Notice from our May 1990 advertisement how we can wrap the result around graphics or in fact anything, of any shape. When we wrote Professional Publisher (PP), we knew it was a very special sort of program. PP can produce pages of quality - virtually indistinguishable from those prepared on professional typesetting kit, the only limiting factor might be your printer; however while the very best output from PP will be obtained from 24 pin models and lasers, you will be stunned by what PP can squeeze out of the humblest 9-pin machine. Great care was taken in the design of PP so we were absolutely sure that no actual knowledge of, or practice with desktop publishers was required in order to use it (the "Professional" in "Professional Publisher" refers to the output quality, not the level of operating skill required. When you use PP, you will notice that at each and every stage a menu is available (there are getting on for a hundred menus in total) with a list of options selected by using either the cursor keys and SPACE bar, or by pressing a digit key - use what suits you!

There is context sensitive, on-screen help too. When you get more experienced with the program, you may select Command mode (using the Enter key) and choose operations directly using the menu system. PP is more user-friendly than any page-making program we have ever seen on any computer, period. Let us talk you through how you might choose to produce a page or succession of pages. This is just one way you might proceed: PP does not impose any sequence of steps upon you, and you can omit certain operations altogether. You will have pre-configured PP to boot up with a generous lot of fonts (you select which ones you are likely to want - of course you can load additional ones or discard existing ones, at run-time too). You could then set the required page dimensions and orientation, as well as not-necessarily-symmetric margin, grid, gutter, column and navigation-guide positions (yes, half the PP manual is a glossary) - you could have pre-configured PP for these too, or loaded in alternative layouts (layouts are distinct from page contents) you've created in previous sessions - if you don't set layout we'll use the default, or the one used for the previous page. Now you would plan the page in detail. Laying out graphics (if any) comes next - you can create these in PP itself, with its superb rubber-banding, dozens of brushes, palettes, texture-fills and so on. Alternatively, you can load in screens created elsewhere, including Eye-Q, Easel, any other graphics programs or digitiser into a cut and paste buffer and paste them into the page (including resizing, slanting, scrolling and texturing) are available, and then take the finished product onto the page. This done, you might insert headlines or captions, selecting from the dozens of fonts available. Each font can be manipulated in billions of ways (yes, we mean thousands of millions): to give but two examples, you have a choice of 32 slopes for italics for the font, and dozens of aspect ratios are selectable. Now you might opt to get the main body or bodies of text down on the page. As fonts are defined to great accuracy (upto 2304 pixels PER CHARACTER!) jaggedness is a thing of the past, and visually the choice of fonts can only be described as stunning! You can do this either by directly typing it into cursor-dragged boxes (with all the options you would expect from a dtp system, and a few extras besides) or by loading it in from file created by Quill, PERFECTOR, Editor, The Laser Processors. The latter method is better (because you retain the text as a character stream rather than as pixels when you save the file). Highlights such as bold, underline etc which you may have inserted into the text are preserved. Indeed, you can control PP's operation from within the text file itself. If you are an advanced user, you can even teach PP your own mnemonics, so that it switches between different styles and modes as it encounters instructions you put into your text file when you created it! The imported text file is editable within PP. It is up to you to decide where the text is to lie - PP places no restrictions on either the number or the shape of the windows into which the text is to flow: they need not be rectangular, and can have any irregular border, and can even overlap or be contained one inside another! You can freehand-draw (there's excellent rubber-banding to help you) the window borders as you choose, to get any effect you desire, to fill any space you wish and to avoid any existing material already on the page (or to reserve room for new material). Amazingly, within the window the text will all be perfectly micro-justified in the font(s) of your choice, however bent or contorted you made the border. Text will flow automatically from one window to the next either until you have run out of text or out of windows. There are many text formatting facilities: you can select word-wrapped, force-broken or hyphenated, and you can specify minimum numbers of "pre-hyphen" and "post-hyphen" characters so that absurd hyphenations are avoided (if no sensible hyphenation position can be found the word is wrapped instead). There are so many fine-tuning controls here that the rest of this ad could be devoted to describing them, and would still leave things out! We will have to content ourselves with but one example: with micro-justification (pixel by pixel spacing, not crude character by character stuff) we even allow you to specify what % of padding space is to be allocated between characters and how much between words! Text work completed, you can then put in the final touches by adding borders, shadows, patterns or designs, overwriting or slipping under or combining these with existing material, repositioning parts of the page if necessary. The end result - be it for a letter, letterhead, document, manual, article, newsletter, magazine, book, thesis, ad - is far better than you have any right to expect from a piece of software costing under £2,500, let alone under £100...

PROFESSIONAL PUBLISHER TOOLBOX

For Professional Publisher users - this useful addition not only supplies several man years worth of beautiful high definition fonts - including familiar types like Roman and Universal - but also contains many smaller fonts, more clipart and programs to load Sector Software's clipart filter into Professional Publisher pages as screens (for importing into any graphic program - like Eye-Q - or manipulating via SuperBASIC) etc. Excellent value.

FONT ENLARGER

For Professional Publisher users - loads of large fonts are automatically created by this multitasking utility, as and when you need them (or in advance), by enlarging existing smaller fonts from PP itself and from Lightning Special Edition and hordes of other sources: with this there is NO jaggedness at all. A font editor for small and large (hdf) fonts is included.

GRAFIX

Scaleable output for all our desktop publishers on 9- and 24- pin printers: a useful alternative to the built-in drivers.

EYE-Q

There is no way to describe Eye-Q except as the best graphics program for the QL. This master is now four years old, and we find it has never failed to change anything its use is characterised by absolute simplicity, speed and power. It has that indefinable precision "feel" that is just right. All the expected manipulations are provided. Whether your needs are technical drawing, labelling, design, illustration, freehand work, copying - or just having fun, Eye-Q will not disappoint. Of course it is menu driven with context-sensitive help. The system takes 5 minutes to learn. The variable zoom and fill facilities, anti-fingerslip measures, cursor acceleration and so on make Eye-Q a classic in its own time.

ULTRAPRINT

To get the best printer output from Eye-Q or any other graphics program from any other source, Ultraprint delivers. An amazing 22 styles to choose from: enhance contrast (for line output) or gradation (for pictures) and vary magnification... A printer without Ultraprint is no printer at all.

MEDIA MANAGER SPECIAL EDITION MEDIA MANAGER

MMSSE is a joy to use. Whether something has gone wrong with a disk or tape ("Not found", "Not valid", "Quill file", "Bad or changed medium", "Read/write failed" etc) or you want better control over your programs and data, MMSSE should be to hand. Virtually any calamity can be recovered from automatically: all permutations (accidental deletion or part-overwriting, part-formatting, errors yielding: bad map but OK directory, bad

directory but OK map, bad map and directory, OK map and directory but bad file sectors, unknown fault, power glitch corruption and so on) have been carefully thought through and catered for. If nothing is wrong, but you just want to explore and understand more about your system, you can potter to your heart's content, assisted by the clear and packed-with-facts manual. Dozens of different diagnostic printouts can be produced. The whole system is menu-driven, with context-sensitive, on-screen help for every option. The speedy Sector Editor is a positive delight: the collector file facilities, bulk recovery, auto-navigation, skipping through the medium in physical, file (if map), logical (if no map) or uncollected/logical (if destroyed map, and because of "chequered" history with lots of overwriting/deletions) no one-step recovery available sequences must all be experienced to be believed. **MMSE** is extremely simple to operate, and assumes no advance knowledge whatsoever. Alternatively, if you wish to tidy up your disks or cartridges, **MMSE** allows you to change volume format names, sort directories into alphabetic, date or size order, analyse file contents and histories, change case of filenames, move data/programs to/from alien-format disks, introduce or break copy-protection systems (illegal use prohibited!), **MMSE** can and will deliver the goods. It is absolutely superb. The standard **Media Manager** is much less powerful, and less easy to use. It is only for those on a tight budget.

TOOLKIT III WITH ROM TOOLKIT III

Virtually everyone with a disk system has Tony Tebby's fine TK2 Supertoolkit on board (usually built into the disk interface). Toolkit III - which works whether or not you have TK2 - takes off where TK2 ended, adding about 70 new commands and enhancing many existing QL and TK2 commands. TK3 is for everyone with a QL. You can get this system on cartridge/disk, with or without a plug in ROM cartridge in addition. The documentation is complete and very comprehensive. Some of the added commands are:

```
ADIM * ADIMN * AND L * ATYP * BASREF * BV BASE * CHANNELS *
CH BASE * CINT * CLOSE * DEVLINK * DIR USE * DITS * DIV L *
EOR L * EXTRAS * FACC * FLP * START * FLP TRACK * FLP USE *
* FRAC * ISFLT * ISINT * KEYS * LARRY * LOWERS * MEMCOPY *
MEMSWAP * MJOB * MJOB W * MOD L * NFS USE * ODD * OM INIT *
ONPIPE * OR L * PEEK F * PEEKS * PEND * PIPE * POKE * POKE F *
PREP * QDOSS * QIN * QOUT * QTEST * QWAIT * RAM USE * REPLACE *
REPLACES * RESET * RJOB A * ROUND * SARRAY * SEARCH * SETDIR *
SETDIR A * SETHOST * SETNET * SETRO * SETRW * SETSYS * SETUSER *
SGN * SORT * SORT * SUCC * TK3 EXT * UPPERS * USER * WN BASE *
WSETHOST * WSETNET * WSETHO * WSETRW * WSETSYS * WSETUSER
```

Whether or not you can program, Toolkit III is of great use!

OFCLICK CARD INDEX SYSTEM

Few users actually require all the facilities of a complicated database like Archive. Oflick presents a very convenient alternative - a very fast, simple to use card-file database, with easy to learn, snappy search and navigate commands and clean file-handling. You can move Archive data to/from Oflick. You can run multiple copies of Oflick. And Oflick's data is organised so it is easy to program from SuperBASIC, even for tyros!

PERFECT POINTER TOOLS

This excellent program gives you an on-screen pointer (arrow) environment of incredible smoothness, and 6 utilities with it. To explore the world of QPtr, Things, Hotkeys, Window Manager....

ONICK MULTITASKING SYSTEM

A pull-down menu controlled multi-tasking front-end, ideal for running in the background and giving you notepads, file-handlers, quick backup, clock, diary, mini-database, calculator etc etc.

DISKTOOL WITH QUICKDISK

An exciting way to accelerate disk access by upto 30%, add password protection to disks and to optionally increase disk storage capacity by 36K to 1512 sectors! All this works while maintaining full compatibility and normal disk control...

DIGITAL C SPECIAL EDITION DIGITAL C COMPILER

Superb C compilers these - fast in execution, they produce extremely speedy and concise code. No nonsense documentation is included. The Special Edition has many more features, including pointers, long pointers, structures, >64K code size, direct access to traps and vectored utilities, and is twice as fast because of its more efficient C/QDOS libraries.

TURBO BASIC COMPILER + TOOLKIT

This state of the art system will automatically convert ordinary SuperBASIC programs - the sort you buy, write yourself or type-in from magazines - into machine code, the language of the 68008 CPU, the brain of the QL. Such pure machine code programs run "directly", without the need to be interpreted by any intermediary system. This direct execution makes them MUCH faster in execution than BASIC. Turbo also adds a host of useful high-speed commands (called "toolkit extensions" if you are fond of jargon). Here are some things, all carried out on a JS Trupcard QL, to give you a taste of just how much Turbo can improve things:

| | Iterations | SuperBASIC | Turbo'd | Speedup |
|---------------------------|------------|------------|---------|---------|
| Empty FOR...END FOR Loop | 30000 | 49 sec | 1.3 sec | 38x |
| Empty REPEAT Integer Loop | 30000 | 151 sec | 2.4 sec | 63x |
| String concatenation | 3000 | 448 sec | 0.4 sec | 110x |
| Search through memory | 300000 | 1410 sec | 1.5 sec | 900x |

Turbo's automatic conversion process, called compilation, is as simple as this: (1) Boot up with the Turbo disk (2) Load in or type in your BASIC program (3) Enter the word CHARGE, and watch the friendly front-end menu pop into view (4) Choose a filename for the machine code task that is to be generated and (5) Press the SPACE bar. Turbo does the rest! Compilation is a one-off process, and is very fast too - it takes little more time than loading the original program did! Once compilation is finished, you have a machine code version of the original program. Start this with EXEC, just as you used to invoke the original program with LRUN: besides the tremendous difference in running speed, you will notice that the program loading time is cut down to a few seconds at most (big SuperBASIC programs can take half an hour or more to load). The EXEC mechanism also allows you to multitask programs, something impossible with SuperBASIC, as well as manipulate their time-priorities, link them together, exchange data and even share parts of their code while executing. If you are an advanced user, Turbo's numerous fine-tuning facilities, 200-command toolkit (a terrific complement to the famous Supertoolkit) and 300+ page manual will be irresistible. If you are a beginner, you will wonder how you ever did without Turbo's program diagnoses and auto-correction. Turbo is more than a very clever optimising compiler. Turbo is magic. If you do not have it, you can have no conception of the experience you are missing and the power you are forfeiting.

SOLUTION WITH DR-DOS 75.0 SOLUTION

This program transforms your QL into a pretty compatible - albeit not fast - PC clone. Solution will run over 95% of the "big name" PC software you have read about, missing out only on programs that make illegal use of the PC's operating system. Solution works solely from software so you don't have to worry about ripping your QL to pieces to fit anything, or have anything hanging out of the back. Just boot up the Solution disk and you will be using a PC, which will then ask for a copy of DOS (any) (just as it would if you were using a "real" PC). End of story - you are now using a PC. There are very few restrictions: both mono and colour CGA graphics are supported, 479K is available for PC software on a 640K machine and 667K when using Trupcard - more than you will get on a PC or XT! Speed can be increased by using Lightning Special Edition but in final analysis just can't compare with Conqueror's speed). Because your newly aquired PC is really a QL you can multitask two or three PC programs (try doing that on a "real" PC!). You can also run QL programs alongside PC programs (DON'T try that on a "real" PC!). Converting files (data in either direction) between QL and DOS is no problem and you can re-configure the QL keyboard if you wish.

PROFESSIONAL ASTROLOGER PROFESSIONAL ASTRONOMER

Our use of the term "Professional" in the name of an application program does mean that the quality achieved will meet or surpass the highest professional standards for that application. The term does NOT mean that you have to have the knowledge of a professional in order to get the best out of the programs. Astrologer teaches you astrology from scratch, and enables you to produce reams (if you are short of paper, you can choose exactly how much) of narrative printout giving a person's horoscope, personality delineation, year-to-year life overview, detailed day-to-day (in fact, minute-to-minute!) predictions, as well as two-person compatibility interpretations. Also provides all the technical readouts, charts and zodiacal wheels you would expect. It is extraordinarily fast (there is a great deal of very clever maths within it) and it performs the whole computation in under a second. The author of the manual is the author of this advert, so you can expect a lucid and humorous read! Whether or not you believe in astrology - indeed, especially if you do not - this program is one that you cannot afford not to have. Scores of detailed readouts for famous people are supplied, incidentally - very interesting reading they make too... Discover Mrs Thatcher's secret yearnings, explore yourself, play the Stock Exchange... Astronomer is an extremely efficient solar system computer, with planetarium views, planet faces (with shadows/eclipses), five different co-ordinate systems, 1sec-1day cinerama, etc. Astrologer + Astronomer is supplied at a very low combined price.

ACT SPECIAL EDITION

The Adventure Creation Tool is for every programmer or putative programmer. Whether or not you have any interest in adventures, you will find something useful here. Animated graphics, data compression, language design and parsing, maps, object-oriented control and much more, with an excellent educational manual too.

3-D PRECISION CAD SYSTEM

2-D and 3-D design and manipulation, at a speed sufficient to permit real-time animation! Whether or not your interest is serious, 3DP will change the way you look at the world around us. The variable viewpoint, perspective and magnification is very smooth in addition to dot-matrix output, plotters are catered for.

SUCCESS

Run CP/M programs on your QL! What more is there to say, other than that after the PC family, no more common system exists than CP/M, with thousand of cheap programs... And Success is fast!

THE EDITOR SPECIAL EDITION THE EDITOR

If your needs are for a technical Editor, or for full access to the entire ASCII character set (to handle machine code or compressed data files) or if your budget cannot stretch to PERFECTION, then this is the program for you. Editor is command-line driven and programmable. The Special Edition version is certainly better than the standard version: that is because the standard one contains only as many features as we could get to fit into an unexpanded QL. Both are fast and flexible, and very powerful indeed in the hands of the intelligent. Not a word processor, Editor's a way of life.

SPECIAL DESKTOP PUBLISHER DESKTOP PUBLISHER

Both these WYSIWYG ("What You See Is What You Get") dtp systems are excellent in their own rights - it is only when you compare them with the stunning Professional Publisher that you become aware of their shortcomings. You won't get fonts as large or smooth as with PP, or wrap-around graphics, or as sophisticated a printer driver or text/graphics file import facility. You will get a very workmanlike tool, capable of producing output that the computer press described as fantastic and superb... The standard edition is the ideal if you do not have a disk drive: if you do have one, go for the Special version, which correspondingly has more features including textures, large windows, better drawing and improved command entry. All upgrades are possible, and there is only a £10 penalty for doing it in two stages. So if you simply cannot afford PP, one of this pair is certainly for you.

SUPERFORTH COMPILER WITH REVERSI

Why not learn FORTH, the most logical computer language of all? This superb FORTH-83 compiler produces stand-alone multi-tasking code of speed comparable to C. SUPERFORTH source is even portable to other machines! The manual teaches you the language.

IDIS SPECIAL EDITION IDIS

Machine code (from other people's programs, toolkits and the ROM) is unintelligible until you put it through IDIS, the intelligent disassembler. IDIS Special Edition automates everything it possibly can, and requires no human intervention. It even sorts out subroutines, replaces addresses with names, untangles data from code and so on. Standard IDIS contains as much as we could pack into an unexpanded machine, and is nearly as automatic. If you want to find out how computers work, buy one of these two!

MICROBRIDGE

Never be short of a four for Bridge again. Superb bidding tutor included, based on random hands dealt with lightning speed. Manual a masterpiece. Understands and obeys ACOL and much more.

SUPERCHARGE SPECIAL EDITION

If you have an unexpanded QL, or cannot afford Turbo, but want SuperBASIC programs to go faster, Supercharge is the answer. It has about half the speed of its big brother, is not as tolerant of badly-written programs, and lacks many of Turbo's features (like linking, program sizes >64K etc): nonetheless, it is the compiler about which we received over ONE HUNDRED happy letters from satisfied users all using the word "Excellent" to describe it - and hundreds more who used other equally complimentary terms. The only gripe was about the Lenslok copy-protection, long since removed by us. So now Supercharge is wonderful....

SUPER SPRITE GENERATOR

SSG moves things about the screen rapidly, at machine code speed, directly from simple SuperBASIC. Any number of sprites (each with upto 16 frames for smooth realistic motion), 256 speeds, 256 planes, collision detection and dozens of special effects.

SUPER ASTROLOGER

A cut-down version of the Professional Astrologer - smaller horoscopes and manual, no interpretations for forecasting or compatibility testing. A marvellous buy at the price!

BETTER BASIC EXPERT SYSTEM

SuperBASIC is a super BASIC. If you want to improve your programs automatically, and learn as you do this, get Better Basic.

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Copies files between devices, performing translates as it goes. Needs a ramdisk to run. Can move your microdrive material onto disk, so programs run from disk but you still have access to microdrives.

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Check dynamic operation of programs - IDIS's ideal companion.

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SOFTWARE FILE

SOLITAIRE

INFORMATION

Program: *Solitaire V 1.01*

Price: £15.95 (includes air mail charges, but check current price before ordering. Visa and Master Card accepted).

Supplier: Sharp's, Box 326, Mechanicsville, Virginia 23111, USA. Tel: (USA) (804) 730 9697. Fax: (USA) (804) 746 1978

Solitaire is a standard game for computers, but it doesn't seem to have attracted as much attention on the QL as some other games, such as *Othello*. Maybe the problem of making acceptable images of playing cards puts programmers off. The writer of Solitaire has made a commendable job of the cards, and their 'pips'. Lack of a standard QL mouse makes it necessary to write such games for keyboard use, or restrict them to the very limited market of one type of mouse, or write different versions for several types of mouse. The latter two options make no sense for a supplier with a small market, so this version is played from the keys. It is compiled with *QLiberator* and

Bryan Davies takes some time to be alone with his computer.

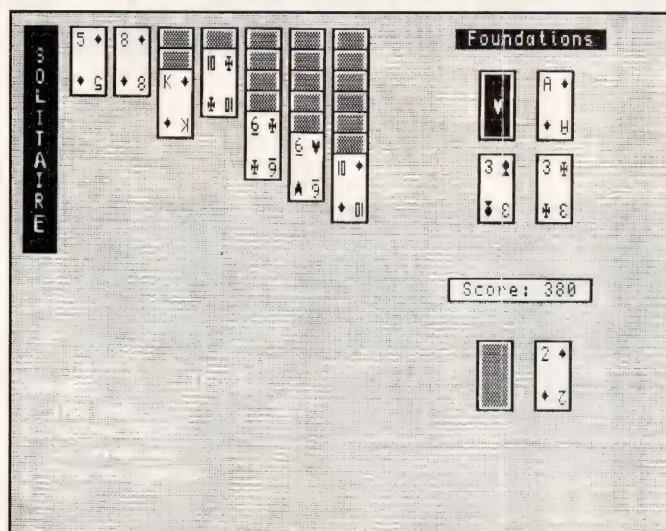
there are no serious delays in operation.

Instructions are in a Quill_DOC file, and are quite straightforward, taking up a little more than one page. The boot file serves only to put up the initial screen, and EXEC_W the program file. You can alter this to EXEC and multi-task the program, but there is only one point at which a cursor is displayed, so you need to be there when switching to other programs. The first actual program screen is a list of high scorers, to give you something to aim at. The lowest score on there is 150, the highest 1550 – quite a range. There are two levels of play, with the lower one being the easiest and scoring only half the points of the higher one. My first attempt netted 650, with the half-points level, so neither disgrace nor a prize looked likely.

Once the game gets going you

are aware of one of the QL's big weaknesses, namely the lack of colours in high-resolution mode; text is displayed in white on a green background, which is not a very visible combination on my Cub screen. Apart from this, the cards and

but this one interested me enough to want to play it again and again. Maybe it is a function of simplicity, or some Ludite streak in me. Whatever the reason, Solitaire kept me at it for several dozen tries, after which my score had finally exceeded the highest on the default list by a sufficient margin for me to retire gracefully. It reminded me a bit of the 'battleships' game tested



their markings are well done, and the overall layout is clear. Ten keys are used to signal the moves you wish to make. You press a key to identify one of the seven columns into which the cards are initially dealt, one to move a card to the 'foundations' (the four piles onto which the suits are assembled by you), one to move a card from the deck (the remainder of the cards, not in the columns or foundations) and one to turn cards from the deck three at a time (only one at a time for Level 1). The program appears to trap 'illegal' moves (but no attempt was made to try all the possibilities for this).

Games tend to leave me totally cold, especially if they concentrate on eating or acquiring treasure of some form,

some while ago, which seemed to retain interest by virtue of its sheer simplicity, and some good touches on the display.

A very minor fault is that when y is selected in answer to the question 'Another game?', the y sometimes turns up as the choice for the next option, 'Please select level 1 or 2'. Since the y is ignored if you key in 1 or 2 and press ENTER, no disruption to the flow of the games need occur.

This is a good little game to have around for some light relief from serious computing. Reasonably-priced, it's easy to learn and play. You are unlikely to make the maximum score, so there's always a target to aim for. Not too taxing for us simple folk!

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QL SCENE

Expansion board from Falkenburg

Jurgen Falkenburg (Computer Technik) has produced a new expansion board for the QL. Falkenburg reports that the *QL-ROM-Card* 'allows for the first time access to the complete QL memory range for several applications'. He recommends it for both unexpanded QLs and models with current ram expansion and disk drives. It can be used to expand rom or ram memory. With the additional power-protected *MOS-RAM-Disk*, it supports the installation of a reset and power-failsafe, write-protectable *RAM_Disk* (mos1_ to mos8_), with up to 256 KB for the QL with two *ROM-Cards* installed. Selection between different applications is done with an

address range selector and other features of the expansion board.

Four memory banks are available on the board, each with a type-selector to choose between the sram and eeprom available.

The board's integral battery backup and write protection switch all the use of static rams to replace eeproms, so that an external eeprom programmer is not necessary. The buffered rams are designed to hold their contents for more than six months before the batteries have to be recharged.

With the addition of the *MOS-disk* driver available, the *MOS-Ram-Disk* can be installed. This is recommended by Falkenburg

as 'ideal for users working only with microdrives'. Frequent use programs can be copied to the ramdisk and can then be started from the *MOS-Disk*. Rommable software like *Quill* can be run directly from the *MOS-Disk* memory, leaving ram space free for data.

More than one *ROM-Card* may be used simultaneously, depending on the number of other peripherals in use with the QL. The free selection allowed from each memory socket allows a variety of combinations which are explained in the user manual. Basically, the different memory types may be expanded with a *QL-ROM-Card* depending on base address selected and the type

and size of memory installed. The QL may be expanded to 1008K of memory with a maximum of 368 K rom, 896 K ram and 256 K *MOS-Disk*.

The *QL-ROM-Card* cannot be used alongside the *TrumpCard* with 738 K ram, or the *Gold Card*.

The export price of the *QL-ROM-Card* is DM 157 (£52) or DM 210 (£70) including the *MOS-Disk* driver and static rams.

The fact sheet from which this information is drawn is available from **Jurgen Falkenburg, Thanweg 36, D-7359 Ersingen, Germany.**

MORE ON QIMI

Quanta has contacted QL World with further information about the *Qimi* mouse and interface (*QL Scene*, September 1991). Manufacture of the *Qimi* interface board in the UK has been commissioned by Quanta, who are therefore able to offer the board to Quanta members only) free of commercial overheads at the considerably reduced price of £25 plus £2 post and packing.

Bill Richardson of EEC has told Quanta that he will no longer be selling the imported interface board, but still has a

stock of *Qimi* Mice available for sale. The UK-manufactured board will be available to non-members from Data Systems for £35 plus £4 post and packing.

Says Quanta Chairman Phil Borman: 'Some of our members misunderstood the report and assumed that Quanta must be buying its boards from Jochen Merz. This is not the case.'

Data Systems man Chris Gregory can be contacted on 0272 513653 during social hours.

Changes in Spain

The Spanish QL users' club in Madrid is now named *QLiper*, and publishes a 3.5 inch disk-based magazine bi-monthly. *QLiper* welcomes any owner

of a computer running a Qdos compatible operating system.

Contact Marcos Cruz, Acacias 44, 28023 Madrid, Spain.

All Formats dates

Dates booked for the All Formats Computer Fair for the remainder of the year are: London Horticultural Halls, Westminster, November 3; Midlands, National Motorcycle Museum, opposite the NEC, November 10; Scotland, City Hall, Candleriggs, Glasgow,

December 1; London Horticultural Halls, Westminster, December 14; Leeds, University Sports Centre, December 15. The organisers write: 'Tip: Come after lunch, when there are no queues, stallholders are more accessible and prices are often even cheaper.'

Advance tickets and information from **John Riding, tel: 0225 868100.**

Toolkit errata

Two printing errors appeared in *DIY Toolkit* in last month, for which we apologise.

The listing one on page 38, one line is missing from the bottom of

the listing. This should read:
bne.s check_chan

The seventh paragraph in the first column of page 39 should read: 'The Turbo-Toolkit variant has the most comprehensive checks. Listing two detects most errors, but may stop if you run out of memory. . .'

OPEN CHANNEL

Open Channel is where you have the opportunity to voice your opinions in *Sinclair QL World*. Whether you want to ask for help with a technical problem, provide

somebody with the answer, or just sound off about something which bothers you, write to: Open Channel, Sinclair QL World, 116/120 Goswell Road, London EC1V 7QD.

Sorcerer

I was recently shown a copy of *Sinclair QL World* by a friend of my daughter. He owns a QL (several, in fact) and is currently working on a very high resolution graphics board for the QL with a lot of success.

The copy in question was the May 1990 issue, and contained a Printer Report in which three contributors described their experiences when linking three different printers to the QL.

One of your contributors,

John de Rivaz, tells of his efforts to link a NEC P2200 to his QL and to his Exidy Sorcerer, and of his need for some kind of reset feature.

I do not own a QL but I do own a Sorcerer (several, in fact) and have had similar problems linking it to an Epson MX80F/T.

Concerning his reset problem, I have fitted a neat looking pushbutton (single pole) to both my Epson and my Star. This pulls the INIT signal line (active low) at Centronics input pin no. 31 down to 0V ground

when I want to clear the printer buffer of rubbish. This method does not cause the Sorcerer to crash as switching off the printer does.

I find his remarks about the Sorcerer and his word processor very interesting because I too had similar problems. The word processor program I use is one originally produced by Exidy and Testan Scientific together and supplied to Sorcerer users in a Rompac. I have a similar program on tape and on disk which I have modified to enable the wordprocessor program to control an Epson printer via codes embedded in the text. If his word processing program is similar to mine in having the output to the printer fed via a vector address, then he could insert this patch into the output chain quite easily by changing the vector address to point to the patch.

The patch I have is in Z80 code (a cpu that Sinclair long ago abandoned!) but the algorithm could be used on the QL so if anyone is interested I will reply to any comments or queries I get.

I am particularly curious about the set-up that Mr de Rivaz has with his Sorcerer and wordprocessor and would be grateful if you could put me in touch.

Jack Swain
Hitchin
Herts

Gold Award

Digital Precision Ltd. only praises when praise is due; consequently we don't praise other people's products very often! However...

Gold Card is fantastic, terrific and superb, and is both strongly recommended and

endorsed by Digital Precision Ltd. It is excellently designed and engineered. It is quite a bit faster than its manufacturers claim (about eight times faster than a 'standard' QL and about five times faster than the most common Trumpcard). It is very reliable, and, perhaps most importantly, it is very compatible – compatibility with most programs (and all of ours, as far as we know) is perfect.

Miracle Systems are to be congratulated for Gold Card and castigated for the over-modesty of their advertisement for it: Gold Card is far better than they make out!

Many Perfection users have told us they think Perfection is the QL product of the year. Digital Precision disagrees – pride of place goes to Miracle for Gold Card (with Perfection a close second). Bravo, Miracle! Long live the QL.

Freddy Vachha
Managing Director
Digital Precision Ltd

Precision

I bought my first QL in January 1987 after reading a review in that month's edition of *QL World* of a new word processor by Digital Precision called *The Editor*. The description indicated that the program was efficient, fast and very flexible. So it proved to be, with further extensions in scope as it was developed into *The Editor Special Edition*.

Over a period of time, one becomes attached to a word processor as proficiency and familiarity increases. To contemplate change involves quite a wrench, but in May 1991 I again read in *QL World* a glowing report of a new word

Editor's Notebook

This month sees the end of the 'mainly for beginners' section of the *New User Guide*, and we know from the letters we have been receiving that new and not-so-new users have found the guide helpful in clarifying and supplementing the original Sinclair QL User Guide (pages 25 to 28).

But fear not! We continue next month with the second part, on SuperBasic and the QL keywords. Author Mike Lloyd compares the 'beginners' section to getting ready for a driving test. Now we can get out on the road.

As a footnote to comments by Digital Precision's Freddy Vachha in Troubleshooter this month, reader Grigoriadis Stathis wrote to us to ask advice on importing QL hardware to Greece. Our first hint is: give your full address. If he writes to us again with his full address, not only will we write to him, we will forward his enquiry to experienced exporters Miracle Systems. We also have a packet for Erling Jacobsen, thanks to fellow reader GM Pheasant, but not his address.

Please write, Erling.

processor by Digital Precision, this time called *Perfection*. Clearly much had happened in the period between the two programs, and I decided to purchase it.

The program has a precision feel to its operation, continues the tradition of flexibility and is very fast. It seems designed to give equal satisfaction to occasional users who can mainly implement commands via the menus and regular users who have the opportunity to use the faster commands.

I have no connection with Digital Precision and its design team, but I offer them my congratulations on a major development for the QL.

**R E Copland
Ryhope
Sunderland SR2 0HT**

QL and Mac

I am an ex-QL user (largely) but would like to suggest to QL owners and Amstrad that Amstrad make a cheap CE-1 computer that could run Mackintosh software and be QL-compatible.

Such a machine with a 68020 or 30 processor could be upgraded to 68040 in future for real QL power.

By the way, I have some QL software and blank cartridges. If any QL owners in Australia would like a list of titles, please write to me.

**Wayne Mocrellini
PO Box 309
Gordonvale Q 4865
Australia**

Registered

For years I've borne, with irritation, the fact that *Quill* and my printer have never reliably kept continuous pages in register. Now I have finally got the solution. First, the preamble in the printer data has to be extended using Install_bas to cancel the automatic perforation skip of the printer. On my Epson-style printer this is done by adding 27.79 (ESC, capital O). Second, the lines per page in the printer data has to be changed to 70 for A4 paper (presumably 72 for 12 inch paper). Thirdly, using 'Design' on the Quill document, the

upper and lower margins are set to zero and the lines per page to 61. The 70 is essential, since it fixes the pitch of the page. The upper margin is set by where you set the page in the printer before starting. The lower margin is set by the 61, since this number fixes how much of the page is printed, counting from the first printed line to the 'page n' which Quill prints three lines below the last line of text on the page. The number of lines actually printed per page is therefore 58. Choice of 61 gives a four-line clear margin at the foot of the page. This means that this number can be set to anything up to a maximum of 65.

None of the above information is obtainable from the original documentation, which specifically states that the default settings of both 'Design' and the printer data are for A4 paper. The 'page n' mentioned above, and the spacing between it and the text, is a default setting of the 'footer', a fact which also is not stated in the manual, and which it might take the casual baffled user, who never has use for a footer, a year to find out. The setting can be changed using the 'footer' instruction.

**Walter Stanners
Over
Cambridge**

Underlined

In the May edition of *QL World*, Beryl Crawley described a problem with *Quill* which had the effect of underlining all her screen output. I also had a similar problem, but it disappeared some time ago and I am not sure why. I suspect it might have to do with the QL overheating, in which case I

recommend Care Electronics' QPower Regulator, which I found simple to fit (I am not an engineer). The only other 'modification' I have carried out on the QL is to buy a mains interference suppressor, available from most electrical shops.

**G W J Daniel
Heath
Cardiff**

Basics

QL users are staunch supporters of Qdos and SuperBasic. The operating system is without doubt an excellent one, but though SuperBasic is powerful there remain possible enhancements which can be found in other Basics. There are times when I look enviously at the Basic of Acorn computers, which have such things as VAL and OLD, or for that matter CHAIN, which allows one Basic program to call another and pass parameters to it.

I also like some of the Basic constructs of the SBASAG extension to Research Machines RMBasic, written for the RM480Z machine by Software Production Associates. It is not difficult to utilise SuperBasic keywords to emulate all of these, indeed, LOOP...ENDLOOP/REPEAT...END REPEAT and CASE...ENDCASE/SELECT...ON...END SELECT are equivalents, but the availability of the WHILE...DO...ENDWHILE and IF...THEN...ELIF...ELSE...ENDIF constructs would be an enhancement to SuperBas both would improve the readability of programs by avoiding the need for additional nested conditional IF...END IF or SELECT...END SELECT constructs.

Particularly like ELIF, which would read better in its unabbreviated form of ELSEIF or ELSELF. For those unfamiliar with SBASAG, the specimen here shows the use of the SBASAG keyword ELIF.

Much neater, don't you agree? Perhaps some enterprising reader could, in the interests of portability of software and of general flexibility, write some SuperBasic extensions to emulate these to save the chore of amending such software. For the RM480Z machine, SuperBasic's EDIT, CLS with parameter and WINDOW would also be welcome USR additions.

Other readers may know of other desirable extensions to SuperBasic that exist on other Basics. Simon Goodwin occasionally requests suggestions for toolkit extensions. I wonder if he, or any other contributor, would consider writing some articles showing alternative ways in which the construction that exist in other Basics could be emulated on the QL using existing keywords, and also write some machine code extensions for the more useful ones.

Perhaps you would consider commissioning a series in the format of the old monthly Keyword page. This would serve the purpose of enhancing our own Basic and making it easier to port Basic programs written on other computers over for use on the QL. I recall that this was the justification for having some of the interior Basic constructions such as the FOR...NEXT loops, GOTO and GOSUB in the QL rom. We still have these, but wouldn't it be even better to have their extras also?

**Ron Allpress
Thwaite
Suffolk**

```
IF <expression> THEN
  <statements>
ELSE
  IF <expression> THEN
    <statements>
  ELSE
    IF <expression> THEN
      <statements>
    ELSE
      <statements>
    ENDIF
  ENDIF
ENDIF
```

```
IF <expression> THEN
  <statements>
ELIF <expression> THEN
  <statements>
ELIF <expression> THEN
  <statements>
ELSE
  <statements>
ENDIF
```


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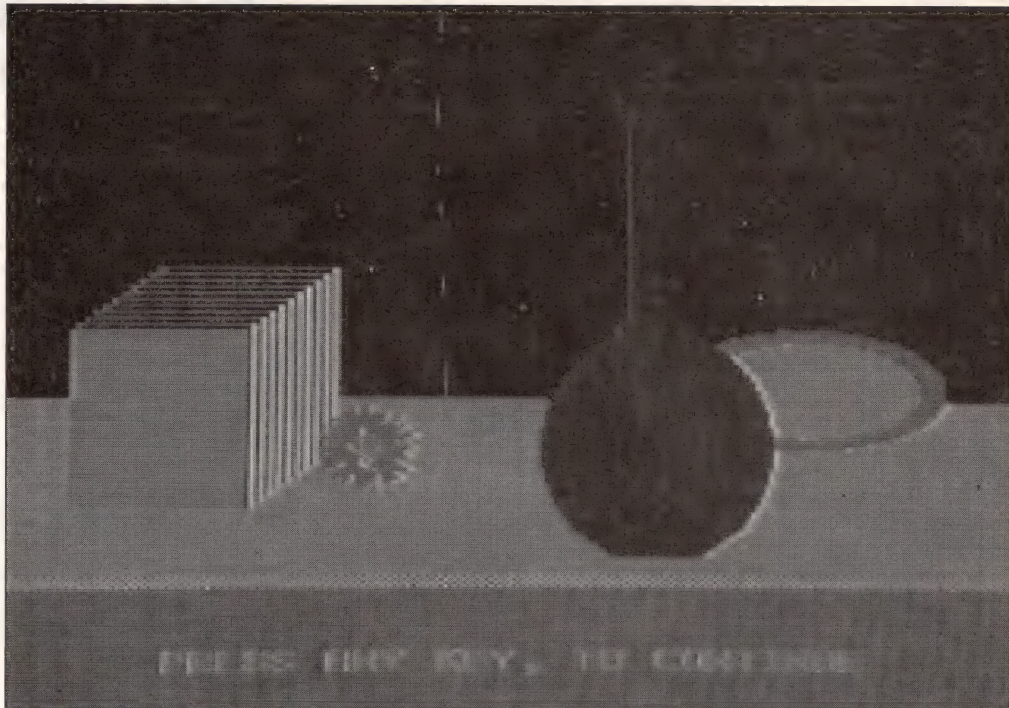
INFORMATION

Program: *Vision Mixer Plus*.
Needs min. 256K ram, and
monitor display.

Supplier: Dilwyn Jones Computing, 41 Bro Emrys, Tal-y-Bont, Bangor, Gwynedd, LL57 3YT.

Price: £22.50. 3¹/₂ or 5¹/₄in disks only.

Vision Mixer Plus is a natural improvement on the video effects program *Vision Mixer* by Dilwyn Jones, which I reviewed in *QL World*, January 1991. The enhancements now include 50 wipe effects (many new), the number of screens is no longer limited by the available ram, mode 4 and mode 8 can be mixed and a few other



VISION MIXER PLUS

small benefits. The main applications, as before, are seen to be in lecturing, business presentations, advertising and entertainment. Indeed they have been used very successfully at Quanta workshops, notably in Portishead.

The program comes with an easy-to-follow 16-page manual which contains all the information needed. A special section is added to show how the user can run from a hard disk setup.

This upgraded program allows the construction of more screens and sequences than was possible with *Vision Mixer* and requires only 128K of memory expansion. This is because *Vision Mixer Plus* does not require the whole sequence of screens to be pre-loaded into the computer's memory. Only one screen at a time is loaded just before it is due to be displayed. Two key characteristics follow directly from this:

John Shaw mixes it . . .

Firstly, the maximum number of screens which can be placed in a display sequence is not a function of the size of memory, but of disk drive capacity – 44 screens for a twin 3¹/₂inch drive using 1440 sector disks, 88 for four such drives (22 per disk), many more for a hard disk.

Secondly, the medium on which the screen images are stored must be available for constant access when the display sequence is running. Floppy disks holding the screen images must remain in one or more of drives flp1_, flp2_, flp3_, flp4_ (or the screens must be stored in Ram2_). A hard disk directory Win2_ holding such screens must be similarly accessible.

The peak memory required by the suite is about 100K, leaving a similar amount free even with only 128K of memory

expansion. The main program MENU shows the free memory, updated each time the MENU is displayed. The program now permits very long sequences of screen images to be presented with, or without human intervention.

It includes a selection of effects for use in the transition from one screen to the next (wipes). In the random WIPE and random colour mode, the program not only offers many hundreds of different inter-screen effects, but it also provides for the WIPE colour to be fixed and/or specific WIPES to introduce specific screens.

Users with larger memory expansions have the option of copying some, or all of the screens of a sequence onto a ram disk (RAM2_) before running the program (subject to available free memory). This

facility can be used to supplement disk storage capacity, or to prevent excessive drive wear when running the program for long periods on a regular basis. A program, RAMLOAD_EXE is included on the disk to help facilitate this.

The time interval for the display of each screen is at the user's choice and can be very easily changed, as can be the choice of screens in a sequence, the order of their presentation, the allocation of WIPES to particular screens and the WIPE colour.

Examples of some of the 110 wipes which are now included on the disk are:

- 1 Venetian Blind Down
- 2 Venetian Blind Up etc.
- 3 Diagonally Split Blockout
- 4 Venetian Blind in Halves Down & Up
- 5 Blockout in Halves Down & Up

PICTURE MASTER

■ ... and gets into the picture.

6 Multi-split Venetian Blind Up & Down
7 As Wipe 6, but solid blackout
8 Two-colour Venetian Blind Down & Up
9 Vertical Venetian Blind
10 Wipe 1 Plus Wipe 9 – two colours
11 Wavy Front Blockout
12 Two wide "snake" Blockout with gaps
13 Multiple Blocks with horizontal gaps
14 Multiple Blocks with vertical gaps
15 Wipe 14 plus Wipe 13
16 Wipe 8 plus Wipe 15
17 Vertical Venetian Blind – wide gaps
18 Wipe 9 plus Wipe 17
19 Four narrow "snake" Blockout with gaps
20 Two-colour Concentric Circle Blockout

All of these screen sequences, and indeed the other ninety, can be SAVED and re-LOADed automatically for immediate use on another occasion.

Users of the original *Vision Mixer* will have to change their methods when using *Vision Mixer Plus*. The much higher overall speed and screen sequence capacity of the latter coupled to its much smaller memory consumption and ease of making changes should allow the imagination to run riot.

Screen

The *Vision Mixer* screen images fill the whole screen, as do the wipes. In *Vision Mixer Plus* the bottom window (channel #0) is used to show the message, or screen title, forming an inherent part of the saved Screen and is not affected by the wipes. This deliberate difference stems from the need to have a set space and format for descriptive text when it is used for lectures, or advertisements.

So here we have the natural progression to *Vision Mixer*, a Rolls-Royce program with the versatility and scope needed to give a much more professional presentation.

A companion program, *Picturemaster*, by Joe Haftke, also available from Dilwyn Jones Computing, allows for the generation of many more new screen images, creating captions, shadowed lettering and drawings, and producing some intriguing screen manipulation effects.

INFORMATION

Program: *Picturemaster*.

Supplier: Dilwyn Jones Computing, 41 Bro Emrys, Tal-y-Bont, Bangor, Gwynedd, LL57 3YT.

Minimum 256K ram required. Monitor display preferable. 3¹/₂ or 5¹/₄ in disks.

Price: £15.00

Screenmaster is a comprehensive utility designed to make screens for use with *Vision Master* or *Vision Master Plus*. These screen images can be 'pictures', or text, or a combination of the two.

Text can be produced in a variety of styles, and visuals can be generated using lines, rectangles, circles and ellipses. The figures can be moved, rotate and have their size varied without any limitations and in any QL colour in mode4 and mode8.

Menu

Included are 30 ready-made procedures for making different screens by a simple choice from a menu. Most employ the use of random numbers, resulting in a much larger

selection of screens than the 30 basic designs would suggest. They are as follows:

1. Star 2. Tapes 3. In_sets 4. Twirl 5. Flying Sign 6. Logo 7. Spirals 8. Flowers 9. Fans 10. Vortex 11. Icons 12. Colours_4 13. Colours_8 14. Kite 15. Pumpkin 16. Clover 17. Collage 18. Dart 19. Ant 20. Tent 21. Cones 22. Off_sets 23. Kaleido 24. Fish 25. Printsize_4 26. Printsize_8 27. Bookmark 28. Desert 29. Ellipses 30. Objects.

These and others can be dumped to a suitable printer, with the aid of the user's own copy of "gprint_prt" (a part of *Psion Easel*). The most important feature of the program is that it is deliberately made available in SuperBasic so that users can modify it.

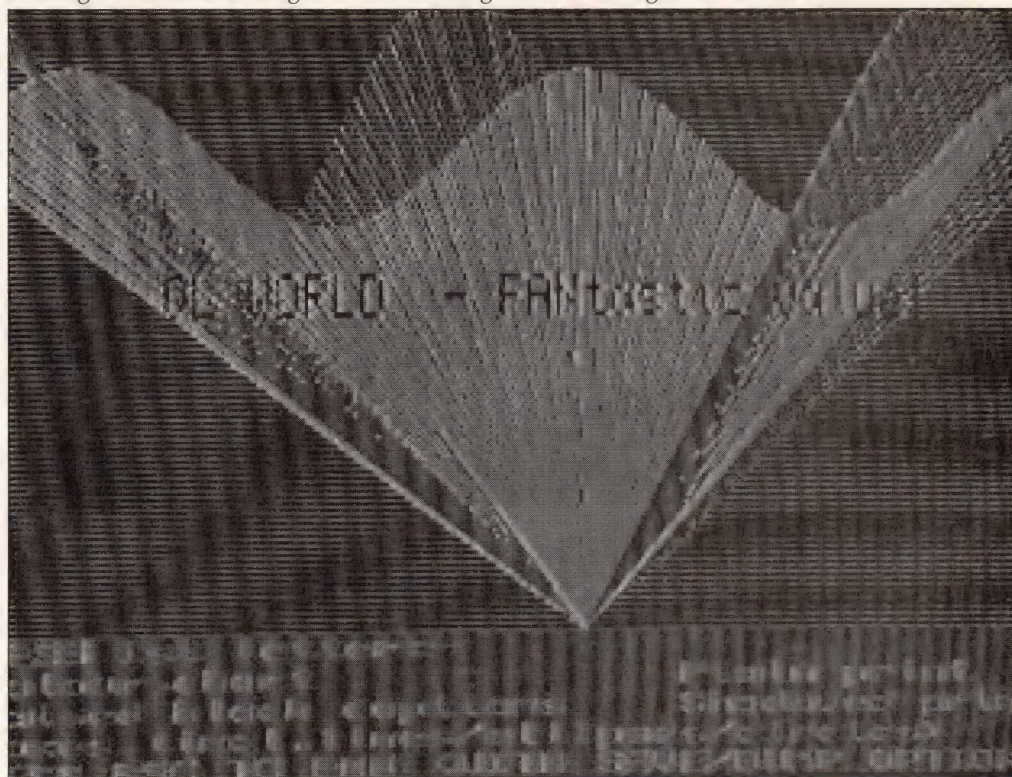
You can generate a large

number of pre-programmed, attractive screen pictures or adapt your own screens to the *Vision Mixer Plus* format with text captions or make text screens in a variety of colours, size and style combinations, very simply and fast.

Similarly, you can generate a variety of geometric figures and patterns and create/enhance screen images, using any combination of the above.

If you prefer, you can QUIT the program and use its many PROCedures as direct commands. Used in this mode, the program still offers all the capabilities of the formal options, but allows the user the freedom to modify parts of the program, experiment and improvise.

The program is supplied with a comprehensive manual which is well laid out and easy to follow.





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QUANTA is the independent QL user's club. If you have not already joined then consider the following:

- QUANTA stands for "QL Users and Tinkerers Association" and provides a forum for users to get together.
- Members requiring guidance on software and hardware can seek out expertise from fellow members.
- Local sub-group meetings are regularly held throughout much of Britain.
- There are also workshops where we and others demonstrate our wares. Members have access to a large software library and can often find spare parts and second hand bargains at QUANTA meetings and can see new products.

The £14 (£17 overseas) subscription includes an informative monthly magazine. Most of all, though, it is good fun so contact the Membership Secretary, Bill Newell, 213 Manor Road, Benfleet, Essex, SS7 4JD, or telephone (0268) 754407 now!

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The **3.2M byte DUAL DISK DRIVE** together with the **GOLD CARD** brings the QL system right up to date. The drive contains 2 mechanisms each able to store 3.2Mb on an ED diskette. ED actually stands for 'Extra High Density' and refers to the rate at which data bits are read from and written to the disk. ED disks transfer data at 1 Megabit per second whereas HD (High Density) transfers at 500K bit/s and the old QL standard DD (Double Density) at 250K bit/s. Please note that these are instantaneous rates and that to work out file transfer times other factors must be considered.

The drive is fully backward compatible in that it can read and write both DD and HD diskettes with any type in either drive. The DD, HD and

ED diskettes are all the same physical size known as the 3.5" form factor. The HD and ED diskettes have an extra hole in their casing, in different places, so that the drive can detect which type of diskette has been inserted. This means that there is no need for the user to tell the QL of the diskette type in use. For example, if you format a DD it will format to 720K, whereas an ED would format to 3.2M.

The drive is fully cased with cable and integral 220/240V power supply and comes with 10 ED diskettes.

We are exhibiting at:

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WINBACK AND VISION MIXER UPGRADES

Dilwyn Jones Computing has upgraded its hard disk backup utility, *Winback*, as a result of the review in *QL World* September 1991. Some minor (and obscure) bugs have been fixed, and the problem associated with large files such as the MSDOS partition has been sorted out – the user now has the option of missing out this file and proceeding with the remainder of the backup. An upgrade to the program, which is now at version 1.10, can be obtained by sending the *Winback* master disk to DJC. The upgrade is free, but please include return postage.

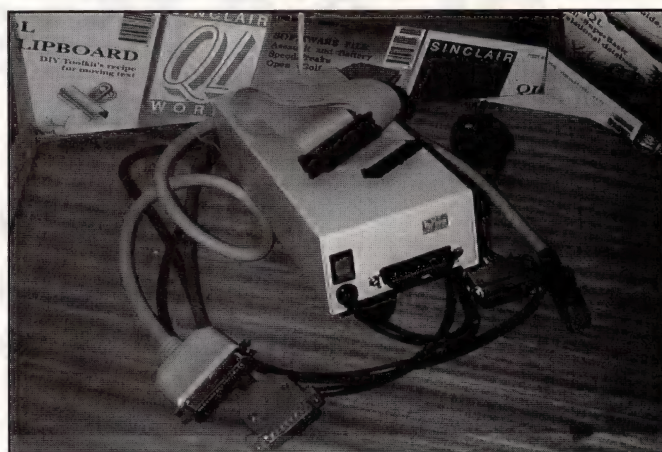
The *Vision Mixer Plus* program has also been upgraded to make it compatible with the *Miracle Systems Gold Card* interface. Upgrades for this program are also available free of charge when the master disk is sent with return postage enclosed. The fix is required because the program previously crashed if the amount of free memory available was greater than 999,999 bytes (ie more than six digits long) and users had to resort to cutting the amount of free memory available with the *RES SIZE* command on the *Gold Card* toolkit.

Further information and returned masters to Dilwyn Jones Computing, 41 Bro Emrys, Tal-y-Bont, Bangor, Gwynedd LL57 3YT, UK. Tel: 0248 354023.

'Universal' Drives from EEC

Following the demise of MGT, EEC Ltd purchased the entire stock of 'lifetime' disk drives, for which they found a ready market, and they are now producing a 1MB and 2MB replacement to be known as the 'Universal' disk drive.

The drive, with the appropriate lead, is compatible with the BBC range of micro computers, the Archimedes, QL, Spectrum, CPC, Atari ST and the Amiga, as well as the PC XT and AT, and most PC compatibles including the Amstrad 1512 and 1640. It can be used with the Spectrum, using a Datel Plus D disk and printer interface, and with the QL using one of the *Miracle* expansion units, also available from EEC. The Universal drive is in a neat grey metal case with mains switch, lead and 13 amp plug. Selection for different computers is done by external dip switches, and the unit is supplied with a dust cover and comprehensive instruction and



installation manual covering the listed micros.

The basic unit has an Amphenol-type socket on the back, similar to a Centronics printer socket, and leads are provided for the various options.

The price of The Universal disk drive is £75.00 inclusive of VAT and any one lead. Leads for the other micros are also available ex stock for £9.95. If a

double drive is required, two units can be supplied for stacking side by side or on top of one another with a special lead for a total of £135.00 inclusive of VAT. Carriage in each case is £9.00, with delivery ex stock while stocks are available.

For further information contact EEC Ltd, 18-21 Misbourne House, Chiltern Hill, Chalfont St. Peter, Bucks SL9 9UE. Tel. 0753 888866.

SQLUG celebrate

It seems like only yesterday when Scottish QL Users Group SQLUG were celebrating their first year together. Actually, it was last September. Being as it has lately been this September – SQLUG are celebrating their second year together. To mark the event, alongside their monthly four-page SQLUG Newsletter, they have produced a *Second Anniversary Special Edition Newsletter*, with 16 pages (A5), an encouraging report of the year's activities, and two useful articles, a general one on upgrading QL systems, and another on repairing damaged disk sectors.

"We are keen to recruit new members, so we would be

grateful if you could mention our continued support for QL users," writes Secretary Alan Pemberton. "For the £6 annual subscription, we offer help and advice at meetings or over the phone, a regular newsletter and access to our large public domain library (bigger even than Quanta's!) In fact, given all our benefits, I'm surprised we haven't attracted more QL users."

No sooner said than done, and many happy returns of the Special Edition. Contact SQLUG through Alan at 65 Lingerwood Road, Newtongrange, Midlothian EH22 4QQ.

Quantem go International

Quanta's East Midlands subgroup, Quantem, have announced that their two-day workshop on the 12th and 13th October will be the first International QL Meeting in the UK. The meeting is being held at the Sherwood Community Centre in Nottingham, which was also the venue for the Quanta AGM. The venue was chosen for its central position in the UK and with regard to ports from Europe.

Personal Opinion

In the first of an occasional column, Eduardo Fairbanks, a long-time user and recent subscriber to QL World, puts forward his hope for the QL in the future.

The fact that the QL has not been produced since 1985 only reduced the strength of the QL scene a little instead of killing it. This is for two main reasons: first, because the QL and its Qdos are very powerful and friendly; second, because QL users and suppliers made a great effort to support the QL. Personally, I think that its long life is due to the genius of Sir Clive Sinclair, Tony Tebby and a few other brilliant people: thank goodness for having them.

Development

Reading specialized magazines we can find people who continue to develop hardware, peripherals and software for QL, and a number of them seem to be very good.

I only recently got a Quanta membership and a *QL World* subscription, but I have been reading about Sinclair micros for a long time. I have been a Spectrum user since 1982 and I have a very good system with eight networked Spectrums and all sort of peripherals. What always catches my eye in the magazines are the differences between European and American users' desires, both for the QL and the Spectrum.

On the subject of software most British users prefer word processors and spell checkers, desk-top publishing, tax accounts programs, and so on. American ones prefer to develop graphics systems, cad and drafting programs, and robotics.

On the other hand, Europeans early on developed interfaces for printers, joysticks and midi. Due to their software preferences Americans buy mice, massive memory cards, I/O and A/D interfaces.

Differences

I remember that in the earlier age of the Sinclair ZX80 and ZX81, one could already find in drugstores I/O interfaces to drive robotic models, speech synthesisers and speech recognition units. They also had disk drives for the ZX81!

Turning back to the aim of this text, I disagree with some people who have written that there are few things more to do on QL developments, now that it already has all a user could want. I recently read about some upgrades for QL users: in Italy Mr Innocenti has developed QL graphics so that he can put up to 32 real colours in mode 4. Mr Delsanti wrote a routine to animate screens and gave it the significant name of QLFilm. I know that some people are now working on hidden line and shading routines for cad packages. We have cad packages for IBM PCs.

Still in Italy there is Mr. Del Bello's say_italian routine running into a speech synthesiser, and Mr Santachiara's music manager. I recently heard about the new video digitizer on the market, from CL systems. Some other articles tell about expansion boards, real time clocks, robot control and so forth.

Increasing

As we can see, the list of new QL features is increasing much faster than one could think for a micro which hasn't been produced for a long time. We can also see that the differences between British and overseas users I pointed out in the beginning is decreasing.

The generality and the versatility we are now going towards necessitate the development of motherboards to multiply the expansion port and the eprom connector, as well as the improvement of the internal voltage regulator and heat sink in order to attach more interfaces. By the way, I already had that problem with my Spectrum system; today my eight Spectrums are powered by four IBM switched power supplies (with fans) giving them the right voltage and current direct to their pcbs, so I took out their heat sinks and voltage regulators, and they run at room temperature.

It is not a good thing to be powering the computer on and off to change peripherals every time you change jobs. It would be wonderful to have them all connected at once. Best would be an expansion board capable of switching each one or several

on or off at our wishes without the need to unplug them. A chip switch should be provided to avoid system crashes when powering the peripherals on and off. The chip switch should be triggered both mechanically and from the software.

The dream

For myself I would connect the Trump card, trackerball, scanner, dot matrix printer, plotter, speech synth, modem, eprom programmer and whatever else is forthcoming. At that level of the dream, one could also design several switchable eprom ports!

Of course, this QL would have a lot of memory, like the old ABC Elektronik's 4 megabyte ram card, or even more. We know that the 68008 can address up to 16 MB of memory, and the Japanese chips are growing faster in capacity while falling down in price. So I think that very soon we could have a 16 MB ram board. An example of what I say is (once more) my Spectrums: I had one of them upgraded by VideoVault from 48 K to 128 K (people always said that could not be done, but it was) and I also have another Spectrum with a co-processor (4 MHz) and 512 KB dram! As we can see, things go on and on and almost anything is possible with electronics and creativity.

Another leap

I have been reading some articles about how we could upgrade the QL to perform another leap on it. Some people wish to have more memory, others more speed, others want to have more graphics resolution on screen, like the Atari and Amiga do. I really don't know how to improve the screen resolution, but a good look into the Macintosh circuitry would give a good idea. The speed is easy; we know that the 68008 runs by four steps of eight bits to perform its 32 nominal bits due to the economy of eight tracks instead of 32. Nowadays the price of a pcb containing 32 or 8 tracks is the same. One could also use

PERSONAL OPINION

the 68030 or even the 68040, much faster than ours.

Do something!

Some people write articles upon this subject and call their project one name or another. Names apart, all of them want to upgrade their systems to the Quantam Leap Mark II because they love the QL and Qdos, and are not happy working with Atari, Amiga and IBM sets. When they have to do this, they use on these machines a QL emulator. Those people really want to do something in the near future, and I'm of a like mind.

Nevertheless some other people advise against this type of project on two counts: firstly, Amstrad's rights over Sinclair and the Quantam Leap; secondly, cost.

Well, the QL Mark II would have a rom like Minerva and an enhanced Qdos. Some people have written (and they are right) that the project would cost a lot in planning, design, production and marketing. They say that if established people and corporations in the market don't have interest in producing it, how can a group of users do it from the bottom?

Well, I have some ideas on how: great

corporations and users have not exactly the same targets; they have profits to care for (that is their business), and we only want a product that fits well. But we have something that they cannot allow for: there are a lot of us.

We could combine our purposes and share the costs of the enterprises. I heard that in Quanta alone there are 2,000 users, still growing.

I also think that Spectrum users should be involved too; a lot of them would love to upgrade to QL. We could collect hardware projects that individual users had developed, and mix them to produce the major design. Of course main suppliers should be invited to combine with the whole group, sharing (selling?) experiences and technology, and supplying parts. Their quotes must have a different value and return rates, because of their financial needs.

Available

The design should employ parts already available in the market, like power supplies, keyboards, video encoders and so forth, to reduce the costs of small scale production of new parts. The project also must be conceived with the possibility of

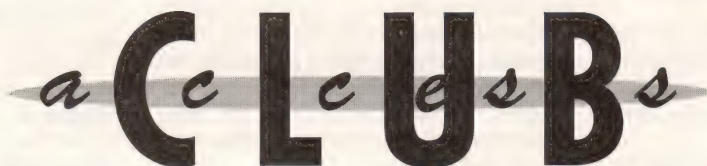
extending the equipment so people could afford some modules at a time.

Then a new worldwide enquiry would have to be carried out, to tell people what the new Mark II will be, what the versions would cost, and asking for membership payment.

I wish I could give some ideas to improve the QL scene, and I'd like to hear about others' improvements on that.

**Eduardo Fairbanks
Brazil**

If you have an informed view of how the QL has developed during its history and where it should go from here, and want to offer it for publication, please write to the Editor for an information sheet, or submit a double-line-spaced text of no more than 2000 words if you prefer. Personal Opinions should concentrate on the development of the QL in the light of personal experience. Responses to a published Personal Opinion intended specifically for the author will be forwarded; please say whether or not you are willing to have parts of your response quoted in Open Channel. Sorry, we cannot forward confidential mail. Short letters to QL World in response to Personal Options will be considered for Open Channel in the normal way.



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International QL Conference
bulletin board system (Swedish
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Magazine: *Qitaly Magazine*.
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Valeriana 44, 23010 Berbenno
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Scottish QL Users Group Contact:
Alan Pemberton, 65 Lingerwood
Rd., Newtongrange, Midlothian
EH22 4QQ. Newsletter.

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Magazine: *Quasar*. Editor: C H M
Biemans, Elzenstraat 5, 5461 CL
Veghel, Netherlands.

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Sinclair QL User Club eV (Ger-
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W5460 Ochenfels, West Germany.
Magazine: *Quasar*.

SPAIN

Qliper Editor: Marcos Cruz,
Acacias 44, 28023 Madrid, Spain.
Magazine: *Qliper*.



THE NEW USER GUIDE

In this, the final part of the Beginner's section of the Sinclair QL World User Guide, Mike Lloyd examines the all-pervasive influence of computer logic.

SECTION NINE

Binary logic

Along with all other computers, the Sinclair QL gets its fair, or unfair, share of the blame for 'computer errors'. It is extremely convenient to be able to instruct a machine to carry out a task and then blame it for doing what it was told to do, instead of doing what it was expected to do. The widespread introduction of computers has thrown into sharp relief the human propensity for being vague. My university tutor was always exalting the virtue of being roughly correct over being precisely wrong. Computers do not have that luxury.

Often, computer users first meet this insistence on absolute accuracy when their machine rejects a mis-spelt command. But then, to a computer, a word is either a keyword or it isn't. There are no half-measures, shades of grey or room for doubt.

This yes-no world is underpinned at the very heart of the computer by its binary counting system. A computer circuit is either on or off, which can be an analogue of true or false, yes or no, right or wrong, up or down. If two circuits are compared with each other, they reveal a surprisingly rich diversity of information depending upon how they are compared.

Let us imagine that a circuit is switched on if it is raining and off if it is dry, and another circuit is switched on if you intend to go out and off if you intend to stay in. These two circuits can be used to determine under what circumstances you might put on a coat. If it is dry and you intend to stay in (represented by OFF and ON respectively) you will not need a coat, nor would you if it were dry and you intended to go out (OFF and OFF). If it was raining and you intended to stay in (ON and OFF) a coat is still unnecessary, so only if it was wet and you intended to go out (ON and ON) would you reach for your coat.

The logic of this situation can be reduced to a set of statements along the lines of 'If it is wet and I intend to go out I will wear a coat'. Mathematically, this can be stated by a simpler 'YES and YES equals YES'. The logical statement 'If it is dry and I intend to go out I will not wear a coat' can be restated as 'NO and YES equals NO'. Once the underlying logic of the situation has been prised out it can be applied to no end of similar situations: 'If I have the money and the time I will go to the cinema'; 'If the tide is right and the sails are set the ship will go to sea'; 'If the lights are green and the road is clear, motorists may proceed'.

Taking the last example, the QL can quickly be programmed to give good road safety advice:

```
100 REPEAT loop
110   INPUT "Are the lights green? (Y/N)", greenlight$
120   INPUT "Is the road clear? (Y/N)", clearroad$
130   IF greenlight$(1) == "Y" AND clearroad$(1) == "Y"
140     PRINT "You may proceed."
150   ELSE
160     PRINT "Do not proceed."
170   ENDIF
180 END REPEAT loop
```

Notice that the double equals signs mean that either an upper case or lower case Y will be interpreted as Yes and that any other character will be assumed to mean No. The use of subscripts in the IF statement allows the user to get carried away and write Yes instead of Y and still obtain the right answer.

Truth tables

Four logical statements can be constructed from the interplay between two conditions to form what is known as a 'truth table'. Each column of the table is headed by the condition, which is often framed as a question (Is it raining? Are the lights green? etc.). To conserve space, the column headings below are simple statements.

AND

| RAINING | | GOING OUT | | WEAR A COAT |
|---------|-----|-----------|---|-------------|
| NO | AND | NO | = | NO |
| NO | AND | YES | = | NO |
| YES | AND | NO | = | NO |
| YES | AND | YES | = | YES |

The most important element of the truth table is the character of the link between the two logical states. In the above example the link is an 'AND', which implies that only when both states are true will the result be true. This need not always be the case. Imagine that there is an additional circuit linked to temperature and that we intend to wear a coat if it is raining or if it is cold. Assuming that we will now only test this circuit and the 'raining' circuit when we are going out, the following truth table can be constructed:

OR

| RAINING | | COLD | | WEAR A COAT |
|---------|----|------|---|-------------|
| NO | OR | NO | = | NO |
| YES | OR | NO | = | YES |
| NO | OR | YES | = | YES |
| YES | OR | YES | = | YES |

Now it appears that only if it is dry and warm will we do without a coat. Once again a computer program can be written to simulate the situation, this time with an IF statement along the lines of:

130

IF raining OR cold THEN PRINT "Wear a coat"

There is a third logical operator which has more use in computing than it does in real life. Should we decide to go out if it's raining or it's cold, but not if it's both, then our decision to wear a coat will go along the following lines:

XOR

| RAINING | | COLD | | WEAR A COAT |
|---------|-----|------|---|-------------|
| NO | XOR | NO | = | NO |
| YES | XOR | NO | = | YES |
| NO | XOR | YES | = | YES |
| YES | XOR | YES | = | NO |

XOR is a bit of computerese meaning 'exclusive OR'. In other words, if one thing or the other is true then the result is true, but if both are true or both are untrue then the result is false.

The mathematical expression of logic, you might suppose, grew out of the relatively recent study of computing. However, the truth tables and the logic behind them were first developed in the middle of the last century by an English mathematician called George Boole. His fame rests on two publications, *A Mathematical Analysis of Logic* published in 1847 and *An Investigation into the Laws of Thought* published in 1854. His name lives on in the term we use to describe computer logic: Boolean algebra.

Boolean algebra

Another surprising feature of truth tables is their use in the QL's colour display. In physical terms, the colours on your computer monitor are produced by three 'guns' firing streams of electrons at the reactive surface of the monitor screen. There is a red gun, a green gun and a blue gun, hence the description 'RGB monitor'.

All eight colours in the full QL colour set are formed by different combinations of output from the guns. At the points on the screen where none of the guns strike the colour is black; where all three guns strike is white. Monochrome monitors use only one gun, which is why they are cheaper and smaller. Also, because focusing is more accurate with only one gun, monochrome monitors tend to produce sharper images which are easier on the eye for extended periods of work.

QL colour

Consistent with its obsession with binary digits, the QL likes to represent the use of the colour guns by 1s and the absence of a colour gun by 0s. With three bits to represent green, red and blue (in that order) a total of eight combinations can be made with values ranging from 0 to 7. The following table should come as no surprise to anyone familiar with the PAPER and INK commands in SuperBasic:

| GUNS USED | COLOUR | COLOUR VALUES |
|---------------------|-------------------|---------------|
| None | Black | — = 000 = 0 |
| Blue only | Blue | —B = 001 = 1 |
| Red only | Red | -R = 010 = 2 |
| Red and Blue | Magenta (purple) | -RB = 011 = 3 |
| Green only | Green | G— = 100 = 4 |
| Green and Blue | Cyan (light blue) | G-B = 101 = 5 |
| Green and Red | Yellow | GR- = 110 = 6 |
| Green, Red and Blue | White | GRB = 111 = 7 |

Incidentally, when the QL is in four-colour mode the blue gun is used only to produce white. The final binary digit of each colour value is otherwise ignored, producing the well-known combination of black, red, green and white. Check the table above to see how the QL converts the unavailable colours into Mode 4 colours.

Computer designers face a small dilemma when trying to fit this three-bit concept into eight-bit bytes. It is anathema to waste valuable memory space, so the bytes in the computer's screen map would never contain just three used bits preceded by five unused bits. Most computers devote half a byte of memory to each pixel, so the first four bits define one pixel and the next four define its neighbour. The lower three bits of each half-byte (which are affectionately known as 'nibbles') correspond to the colour guns of the monitor. The leading bit is often used to denote brightness or, as is the case with the QL, flashing. Sadly, the QL's designers compromised on functionality in favour of cost-effectiveness in this decision: sixteen colours would have been much more useful than the ability to flash colours, but would have added to the QL's manufacturing costs.

SuperBasic has some interesting operators which allow us to use Boolean algebra directly on binary digits. These are known as the bitwise operators and are listed below:

| | |
|-----|----|
| AND | && |
| OR | |
| XOR | ^^ |

Bitwise operators, Boolean logic and colour.

Let us take the SuperBasic value for magenta (011, or 3) and perform a bitwise AND with the value for cyan (101, or 5). Where the corresponding binary digits are both 1 then the result is 1, otherwise the result is 0. The product of 'magenta AND cyan' is 001, or blue, the only primary colour they have in common. The SuperBasic command PAPER 3 && 5 is therefore a long-winded way of saying PAPER 1.

If the sum were changed so that an OR was performed the result would be white: 011 OR 101 = 111. Neither AND nor OR are particularly useful with screen displays because AND has a 75% chance of removing a primary colour while OR has a 75% chance of adding a primary colour. The results therefore tend towards being black or white.

The XOR operator is different because it produces a similar colour-richness to the colours being mixed. When a colour is XOR'd with white it produces a complimentary colour, so that black becomes white, blue produces yellow and so on. This is demonstrated by the following code snippet:

```
100 MODE 8: CSIZE 3,1: CLS
110 FOR background = 0 TO 7
120     PAPER background
130     INK background ^^7
140     PRINT "The Sinclair QL"
150 END FOR background
```

Using one of the QL's special screen display modes colours can automatically be added together using the exclusive-or (XOR) truth table to produce other colours from the colour set. The command which puts the screen into this mode is OVER -1. If you want OVER to apply to a window other than the default window the command should contain a channel reference (eg OVER#5, -1). To see the effect which OVER -1 has, run the following short routine:

```
100 MODE 8: OVER -1
110 PAPER 0: CLS
120 FOR X = 0 TO 7
130     INK X: FILL 1
140     CIRCLE 50, X*20, 30
150 END FOR X
160 OVER 0: FILL 0
```


Fill bug

Note the careful resetting of the screen mode back to the default of OVER 0: the effects of changing this setting can sometimes be confusing and lead you to believe there is something wrong with the computer. The FILL 1 command is deliberately set into the FOR...NEXT loop precisely because there is something wrong with the computer: a bug in most QL Roms means that subsequent circles are not properly filled unless the FILL command is re-issued.

A more practical use of logical values is to use INK colours as a quick way of identifying negative values in an accounts program. It relies on the way in which the QL can assign a true/false value to any expression it evaluates. A 'true' expression, such as '7 > 3', is given a value of 1 whereas a 'false' expression, such as '7 = 4', is given a value of 0. If negative account balances are to be written in red ink the expression to be tested will be something like 'balance <= 0'. The following program fragment explains how it might be used:

```
3100 REMark Print account balance
3110 INK 7-5* (balance <=0)
3120 PRINT balance
```

KEYROW

Another way to make use of logical values is to test for keypresses. INPUT and INKEY\$ are familiar keywords, but the *New User Guide* has not yet covered KEYROW. The main value of KEYROW is that it can detect multiple keypresses. This is important, for example, in arcade-style games where players might want to move right and fire their laser weapon at the same time. KEYROW is completely unconnected with Ascii character values and it divides the keyboard into eight sets of eight keys on a fairly random basis.

Somewhere in the QL's memory there are eight bytes dedicated to representing which keys are being pressed. Each keypress makes its associated bit turn on. As soon as the key is released the bit turns itself off again. KEYROW gives access to these byte values and it is up to the programmer to work out which keys are being pressed. Logical expressions come in very handy.

The first step is to read a KEYROW value. KEYROW(1) reads the byte which reveals whether the solidus, Enter, space, Escape, or cursor keys are being pressed. If the Enter key is pressed it sets the lowest bit in the byte, equating to a value of one. However, if Enter and the left cursor key are pressed simultaneously the KEYROW(1) value is three. In fact, any odd value between 1 and 255 indicates that, amongst other keys, the Enter key is being pressed. Using conventional IF...THEN statements quickly becomes impractical.

What is needed is a single IF statement which will reveal whether or not the Enter key is being pressed regardless of how many other keys are being pressed simultaneously. Only a logical expression, namely a bitwise AND, can do this. Here is a small routine to prove it:

```
100 REPEAT loop
110   key = KEYROW(1)
120   AT 2,0
130   IF key && 1: PRINT "Enter ";
140   IF key && 2: PRINT "Left ";
150   IF key && 4: PRINT "Up ";
160   IF key && 8: PRINT "Escape ";
170   CLS4
180 END REPEAT loop
```

Each IF statement tests a particular bit and, if it is set to one, prints the key it represents. To save space, only the first four bits are tested here. The CLS 4 command in Line 170 clears the remainder of the cursor line. Try it out by pressing any combination of the four tested keys. Provided that you press the keys simultaneously the screen read-out will correctly identify which keys you are pressing.

Where To Now?

This article completes the Beginner's Section of the *New User Guide*. Rather like the driving test, it simply prepares you to learn on your own. There are plenty of good books on the subject of SuperBasic programming, the best being by Jan Jones. Next month the *New User Guide* continues with its detailed and definitive descriptions of the complete SuperBasic vocabulary.

Next month

This *DIY Toolkit* project extends QL SuperBasic in three ways. ALIAS, CODEVEC and INVERSE have been tested with *Minerva*, *Argos* and *Turbo* tasks. They should suit all Qdos systems and compilers.

The simplest new command is INVERSE, which swaps the foreground and background colours used to display text in a window. Many computer displays support 'inverse video', showing dark characters on a light background, rather than the reverse. It is a good way to highlight selections, whatever the colours in use.

The name comes from the ZX Spectrum print attribute INVERSE, but the QL implementation swaps INK and STRIP colours at every call; ZX BASIC INVERSE 1 and INVERSE 0 turned colour swapping on and off. The optional channel parameter defaults to #1.

You can do the same with INK and STRIP commands, but then you need to read the 'previous' colours with DIY functions like CHBASE and CHAN_B%. Unless you are careful you end up with both colours set to the same value, and invisible text!

INVERSE is simple, easily reversible, and preserves the original contrast. It is a great way to add emphasis in menu displays and prompts.

ALIAS lets you give new names to QL commands and resident functions, like this:

ALIAS "INVERSE" TO INVERT
ALIAS 'EXECUTE_A' TO TRY
ALIAS "SEARCH MEMORY" TO SCAN
ALIAS 'CODEVEC' TO VECTOR
ALIAS 'OPEN' TO OUVRE

Users unaccustomed to English can translate much of SuperBasic into French, German, Spanish or whatever; the only restriction is the 26 character Ascii alphabet common to all QLs, which prohibits the use of accents in resident names.

ALIASed names survive NEW and LOAD. They work at exactly the same speed as the names they mimic, since they use the same code. They are permanent, and consume no extra ram apart from eight bytes in the Name Table and the characters and length in the Name List. You can get rid of them with FORGET.

ALIAS forms a set with the resident function-creators SET and ALTER, the FORGET routine in *DIY Toolkit* Volume B, and *Task Commander*, the Resident Procedure generator presented last month. It is another way of expanding the QL Name Table to make the system easier to use and program. The Name Table is an efficient mechanism that can cope with up to 64K of names with no loss of speed, once lines are tokenised.

ALIAS only works on resident procedures and function names, so it cannot provide substitutes for all the words in QL programs, but it can be convenient if you find yourself mistakenly typing commands for

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I Simon Goodwin shows how to change the names – and colours – of keywords, and then track them down.

other computers while using the QL or an emulator. Why teach yourself, when you can teach the QL on your behalf? For instance, SAM and Spectrum users might use:

ALIAS "DELETE" TO ERASE
ALIAS 'DIR' TO CAT

Other substitutions will suggest themselves to those who use several computers. Some, like the Amiga CLI, match the QL commands quite closely already, though the QL is idiosyncratic in its use of names up to 36 characters long, replete with underscores!

The syntax of ALIAS may seem odd at first, but mimics COPY, RENAME and ALTER. The first name corresponds to an existing resident procedure or function. It appears in single or double quotes, while the second, new name is not quoted. Thus the code can alias any existing function name, without fetching its value instead, and the string to be matched may be an expression.

Each name may consist of up to 255 digits, underscores, small or capital letters (considered equivalent). The second parameter must be an unset name. The QL reports Bad Name unless the first name corresponds to a resident procedure or function.

Other values can move around, allocated and de-allocated on the variable values heap inside *SuperBasic*; it would be dangerous to ALIAS such names, as you might end up with an invalid pointer to space that had been re-used.

ALIAS works fine with the hundreds of names resident in every QL Rom, *DIY Toolkit*, *SuperToolkit*, and common extensions in disk systems. A few QL names are implemented as 'keywords', rather than resident procedures or functions; these include DEFINE, LOCAL, NEXT, EXIT, WHEN, and variants of ON, END and GO.

If you try to ALIAS these you get a Not found error because those names do not appear in the name table. The same goes for the separator TO, and operators like INST, OR and MOD. The only way to change these is to replace your rom.

The ALIAS command should not be used inside Supercharged or Turbo programs,

as they contain no name list, but ALIAS works fine declaring names that are expected by compiled tasks. If a task reports 'name is redefined', type NEW to clear out the name list, and try again. NEW, LRUN and CLEAR do not discard ALIASed names.

ALIAS can be useful when running tasks compiled for some other system. A task expecting the Thor SYS_VARS function stops, reporting 'SYS_VARS is not defined' if run on a normal QL. It would be tricky or tedious to re-compile or patch the file to remove the reference. It is easier to load the DIY equivalent SYSBASE, and type:

ALIAS "SYSBASE" TO SYS_VARS

Eureka! You can use the same principle to emulate missing commands with functional equivalents from other Toolkits.

The majority of names can be ALIASed in compiled programs without trouble, but you may miss out on updates or optimisations unless you are careful in your choices.

Turbo and Supercharge replace calls to some 'standard' resident procedures and functions with optimised routines from the compiler library. They identify the keywords to be optimised by name and position in the name table, so you may get odd results if you use unconventional names.

An alias of the PRINT command will work, but the rom routine is slower and displays only seven digits of precision, rather than the nine digits of the compiler library routine. Likewise MOVE_MEMORY, BLOCK, CODE, CHR\$, LEN, PI, PEEK and POKE are optimised, so your task will go more slowly if you use ALIASed equivalents.

RUN, INPUT, READ, EOF, CLEAR and DIMN work differently in compiled tasks, so you should expect strange results if you call them by new names.

STOP and NEW will have no effect if you use aliased equivalents in a compiled program. These commands normally work by setting a 'stop code' at offset 140, BV.STOPN, among the SuperBasic Variables; the interpreter checks this word after interpreting each statement, but compilers don't do anything so silly; they

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recognise the names, and substitute special code for STOP and NEW.

An aliased version of OPTION_CMD\$ will always return a null string. You need the original name to get the desired result. The same goes for other Turbo directives like REFERENCE, IMPLICIT%, PROCEDURE, FUNCTION and RETRY_HERE.

Compilers replace calls to RESPR with library code to allocate Common Heap memory. An ALIAS of RESPR will not be replaced, so it will give a 'not complete' error if called from a task. Minerva roms fix this by using heap space automatically if the RESPR area cannot expand.

You may come across a few programs where alternative names like SINE and LOG will use the new code if you issue the ALIAS commands after loading. The new names will use the standard rom routines if you use ALIAS before any maths routines are loaded.

The function CODEVEC returns the address of the machine code routine that performs any resident SuperBasic procedure or function. You can use this address to disassemble the routine, or to set a breakpoint, allowing you to intercept calls to the keyword and step through the code.

Which is easier to type? CODEVEC ("ED") or BPEEK_L (BPEEK_L (24) + LOOKUP% ("ED") * 8 + 4)? This function could be replaced by a succession of calls to existing DIY Toolkit functions, but I find it useful and expect it to save typing for anyone exploring new resident code.

CODEVEC is short for CODE_VECTOR; you can of course ALIAS it to anything else you like. To save more typing, ALIAS 'CODEVEC' to CV! I chose the name CODEVEC because it is easy to remember, yet unlikely to clash with existing variable names.

You can use CODEVEC to detect names that correspond through ALIAS, or ones that share code because of Toolkit updates:

```
DEFine FuNction CODEMATCH (a$, b$)
RETurn CODEVEC (a$) = CODEVEC (b$)
END DEFine
```

Listing two starts with the usual hex loader, the same each month, unless you write in to say you prefer the decimal line version used for *Task Commander*. The DATA corresponds to the assembly code in listing 1, but can be entered relatively quickly.

Check and correct the DATA lines if the loader reports 'Checksum incorrect'—otherwise, type the name of the file you want to create, eg FLP1_ALIAS_CODE. Before using ALIAS, INVERSE or CODEVEC you load the code from disk, like this:

```
X=RESPR (434)
LBYTES FLP1__ALIAS_CODE, X
CALL X
```

Alternatively you could use LRESPR, LINKUP to load and link the file, or ALLOCATION to reserve memory if tasks are running. Avoid ALCHP as the space it reserves does not remain allocated when you load a new SuperBasic program.

You do not need to retype the code from **Listing one** or **Listing two**. Binary code, original assembler source and documentation for ALIAS, INVERSE and CODEVEC are available now on 3.5 or 5.25 inch disks, or your microdrive cartridge.

Ask for DIY Toolkit volume **A for ALIAS**, the latest of 18 volumes of utilities and extensions, available from Richard Alexander at Cwm Gwen Hall, Pencader, Dyfed, Cymru SA39 9HA, or ring (0559) 384574. One volume costs £7, two cost £10 and so on, up to £58 for the full 1988-1991 set.

I have updated two volumes with *Task Commander* examples: the MAP command joins volume H, showing the exact allocation and ownership of memory on the heap, in task space, and elsewhere. Volume Q gains CHANS, a SuperBasic keyword that shows details of all the channels in use at any time.

Listing one is the program assembled into ALIAS_CODE. When you CALL the first instructions they point A1 at the table labelled DEFINE, read the BP.INIT vector word from ROM, and jump to that routine. It links the names and addresses at the end into SuperBasic.

The next routine deals with INVERSE. The default is INVERSE 1; brackets, hashes and other punctuation are optional. The most likely error reports are channel not open and bad parameter, if the channel is not a CON or SCR window.

The Qdos call SD.EXTOP is used to find the details of the window. IN-

VERSE says bad parameter if you apply it to a MEM channel. The EXTOP works but the instructions to set the 'ink' and 'strip' fail.

If you are looking for a simple project, consider adapting INVERSE to set both the PAPER and STRIP colours. This takes two Qdos calls in machine code; the SuperBasic PAPER command sets both to the same value.

It is not enough just to swap the ink and paper values. EXTOP reads the colour values, avoiding QRam, QPac and Thor windowing variables, then calls SD.SETST and SD.SETIN to set the colours.

D1 is the only data register passed both ways by EXTOP. I use it to return both colours, exchanging the high and low 16 bit halves with a couple of SWAP instructions.

Two system calls update the colour masks SD.SMASK and SD.IMASK at off-sets 48-65 in the standard channel defini-

```
* QL WORLD DIY TOOLKIT - ALIAS, CODEVEC and INVERSE
* Version 0.3, Copyright 1991 Simon N Goodwin.
*
start      lea.l      define,a1      Point A1 at definition
            move.w    $110,a2        BP.INIT vector
            jmp       (a2)           Link code to SuperBASIC
*
* INVERSE [ #ch% ] - exchanges channel INK & STRIP colours
*
inverse     moveq     #1,d0          Assume channel 1 at first
            cmp.l     a3,a5          Any parameters?
            beq.s     pick_chan
            move.w    $112,a2        Vector to get integers
            jsr       (a2)          CA.6TINT
            bne.s     give_up        One parameter expected
            subq.w    #1,d3          Otherwise, complain
            bne.s     bad_param      Get BASIC channel No.
            move.w    0(a1,a6.1),d0  It must be 0 or more
            bmi.s     what_chan      Scale for Channel table
            mulu      #40,d0         Add the base offset
            add.l     48(a6),d0      Check it is within table
            cmp.l     52(a6),d0      Reject if past the end
            bge.s     what_chan      Pick up the channel ID
            move.l     0(a6,d0.1),d0 Negative if closed
            bmi.s     what_chan      Now A0 is channel ID
            move.l     d0,a0         A2 -> extension code
            lea.l     colour_ext,a2  Infinite timeout
            moveq     #-1,d3         SD.EXTOP trap key
            moveq     #9,d0         Call QDOS IO system
            trap      #3            Check for any error
            tst.l     #40,d0         SD.SETST trap key
            bne.s     give_up        Set STRIP colour in D1.B
            moveq     #40,d0         SD.SETIN trap key
            trap      #3            Set INK colour
            swap      d1
            moveq     #41,d0
            trap      #3
            give_up
            rts
*
colour_ext  moveq     #0,d1          Clear odd bytes of result
            move.b     69(a0),d1     Pick up STRIP colour byte
            swap      d1             Prepare other half of D1
            move.b     70(a0),d1     Pick up INK colour byte
            moveq     #0,d0         OK, no error
            rts
*
* ALIAS "OLD_NAME" TO NEW_NAME for Resident Procs & Functions
*
alias       lea.l     16(a3),a4      Two parameters please
            cmpa.l    a4,a5
            bne.s     bad_param
            bne.s     8(a3,a6.1)     Check type of parameter 1
            tst.b     bad_param      Reject unless it is unset
            bne.s     #0,d5
            moveq     10(a3,a6.1),d5 Pick up the name's index
            bmi.s     bad_param
            lsl.l     #3,d5          Scale: 8 bytes per entry
            add.l     24(a6),d5      Add NT base offset
            move.l     d5,-(a7)
            lea.l     8(a3),a5       Isolate remaining parameter
            bsr.s     lookup         Evaluate parameter 2
            move.l     (a7)+,a5
            bne.s     bad_exit
            move.w     0(a2,a0.1),0(a6,a5.1)
            move.l     4(a2,a0.1),4(a6,a5.1)
            moveq     #0,d0
            rts
```


tion. These masks determine the pattern of bits set in video memory, and hence the colour displayed.

INK 0 is the simplest case. It clears the mask to zero. In MODE 4, INK 7 sets a mask of all bits set. This is the video memory pattern that corresponds to a white display.

The masks depend on the screen mode, as well as the colour and stipple. The first word of the mask is used on even numbered lines, the second on odd lines, to give stipples two pixels deep. In MODE 4, INK 7, 0, 1 stores the masks \$FFFF and \$0000 in SD.IMASK. In MODE 8, the same command stores \$AAFF and 0, unless you select FLASH 1.

There are many cases to consider, and they might vary between machines; it is best to use normal Qdos colour codes, 0-255, and leave calculation of the masks to your system.

ALIAS works rather like ALTER from May 1991's *QL World*. It converts an unset name

into a resident function – or procedure, in this case – by setting the first, third and fourth words in the corresponding name table entry. The second word is unchanged. It points to the name text in the name list.

Phil Spink observes that Unix programmers may prefer to type ALIAS NEW TO "OLD", in the style of an assignment. The DIY code is flexibly written so it can process the parameters in either order, with the minimum of tailoring. If the fourth and seventh lines of ALIAS use offsets 8 and 10 the unset parameter is the second one. Offsets 0 and 2 specify the first parameter.

The other parameter must be the 'old' name string. LEA.L 8 (A3),A5 singles out the first parameter for string LOOKUP; alternatively LEA.L 8 (A3),A5 selects the second. The DIY disk includes code and source to process parameters either way round.

CODEVEC calls LOOKUP to find its parameter, then plucks the relevant address

from the name table with a single instruction. DIY code must work on all QLs and compatible systems, and most do not allow long integer function results, so it converts the value in D1 into a floating point value. The NORMALISE loop shifts the binary value of D5 to the 'normal' position at the left, adjusting the exponent in D4 accordingly.

CODEVEC must check that there are six bytes for its result. The slow call to BV.CHRIX could be avoided if the name is at least three characters long, as the result will fit in the space previously allocated to the string on the maths stack.

The last machine code subroutine, LOOKUP, resembles the eponymous keyword code. This version shows how two extensions can share code to fetch and analyse a parameter. It resets BV.RIP so that memory is not left allocated on the Maths Stack after the parameter has been processed.

```
_param moveq #15,d0      Signal BAD PARAMETER error
_exit   rts               Error code is in D0
t_chan  moveq #-6,d0      CHANNEL NOT OPEN error
        rts
```

CODEVEC("NAME") returns code address for any Resident NAME

```
evect   bsr.s    lookup      Try to find the name
        bne.s    bad_exit
        move.l   4(a0,a2.l),d1 Pick up its code address
```

ETURN_FP stacks D1.L in SuperBasic floating-point form

```
urn_fp  move.w   d1,d4      D4 will be exponent
        move.l   d1,d5      D5 will be mantissa
        beq.s    normalised Zero is a trivial case
        move.w   #2079,d4    First guess at exponent
        add.l    d1,d1      Already normalised?
        bvs.s    normalised
        subq.w   #1,d4      No, halve exponent weight
        move.l   d1,d5      Double mantissa to match
        moveq    #16,d0      Try a 16 bit shift
        malise   move.l   d5,d1 Take copy of mantissa
        asl.l    d0,d1      Shift mantissa D0 places
        bvs.s    too_far    Overflow; must shift less
        sub.w    d0,d4      Correct exponent for shift
        move.l   d1,d5      New mantissa is more normal
        _far     asr.w     #1,d0 Halve shift distance
        bne.s    normalise  Try shift of 8, 4, 2 and 1
```

Check there's six bytes of space for the result

```
malised moveq #6,d1      No. of bytes needed
        move.w   #11A,a0   BV.CHRIX vector
        jsr      (a0)
        move.l   #58(a6),a1 Get a safe A1 value
        subq.l   #6,a1
        move.l   a1,$58(a6) Grab 6 more bytes
        move.l   d5,2(a1,a6.l) Stack mantissa
        move.w   d4,0(a1,a6.l) Stack exponent
        moveq    #2,d4      Floating point result
        moveq    #0,d0
        rts
```

LOOKUP "string parameter" -- NT entry @ (A2,A0) or error

```
lookup  move.w   #116,a0    Fetch CA.BTSTR vector
        jsr      (a0)
        bne.s    bad_exit   Quit unless it worked
        subq.w   #1,d3      Check for ONE parameter
        bne.s    bad_param  Moan, otherwise
        move.w   0(a1,a6.l),d0
        beq.s    bad_param  Reject a null parameter
        move.w   d0,d5      Save length for later
        lea.l    2(a1),a5    Save offset of text
```

Calculate UPPER/lower case; set bit 5 of parameter bytes

```
        moveq    #32,d7      Case conversion mask
        moveq    #1,d2      Odd/even length mask
        and.l    d0,d2      D2=1 if length is odd
        _k_case  or.b     d7,2(a1,a6.l)
        addq.l   #1,a1      Advance through text
        subq.w   #1,d0      Count down length
        bne.s    lock_case  Convert all characters
        lea.l    2(a1,d2.l),a1
        move.l   a1,$58(a6) Tidy the RI stack
```

```
*
* Now find SuperBASIC task (0,0) and its Name Table
*
        moveq    #0,d2      Search entire task tree
        moveq    #0,d1      Look for SuperBASIC
        moveq    #2,d0      MT.JINF Trap key
        trap     #1         A0 := base of task 0,0
        move.l   a0,a2      A2 -> BASIC system vars
        move.l   24(a2),a0   A0 -> Name Table Start
        move.l   28(a2),d0   D0 -> Name Table End
        move.l   32(a2),d3   D3 -> Name List Start
```

```
*
* Scan the Name Table for names with the right length
*
next_name move.w   2(a0,a2.l),a3 Pick up offset in NL
        add.l    d3,a3      (A3,A2.L) -> Name
        cmp.b    0(a3,a2.l),d5 Compare length
        beq.s    got_length Length matches!
        advance_n1 addq.l #8,a0 Advance through NL
        cmp.l    a0,d0      Stop at the end
        bhi.s    next_name
        moveq    #-7,d0     Signal NOT FOUND
        rts
```

* Check the name text to see if it matches the parameter

```
*
got_length move.b   1(a3,a2.l),d4
        or.b     d7,d4      Ensure consistent case
        cmp.b    0(a5,a6.l),d4
        bne.s    advance_n1 Mismatch, try another
        move.w   d5,d6      Save residual length
        subq.w   #2,d6      DBRA count for the rest
        bmi.s    found_it   Found name, length 1
        move.l   a5,a4      D4 & A4 are temporary
        check_name move.b   2(a3,a2.l),d4
        or.b     d7,d4      Convert case of name
        addq.l   #1,a3      Step through Name List
        addq.l   #1,a4      Step through parameter
        cmp.b    0(a4,a6.l),d4
        dbne     d6,check_name
        bne.s    advance_n1 Name mismatch, go on
```

* Check that the name is a Resident Procedure or Function

```
*
found_it move.b     0(a0,a2.l),d1
        subq.b   #8,d1      Expected type code 8 or 9
        bmi.s    wrong_type
        subq.b   #2,d1      Check type code <= 9 (!)
        bpl.s    wrong_type
        moveq    #0,d0      No error, CODEVEC is in D1
        rts
```

* wrong_type moveq #-12,d0 BAD NAME error code

```
*
define    dc.w     2          Two procedures
        dc.w     alias-#
        dc.b     5,'ALIAS'
        dc.w     inverse-#
        dc.b     7,'INVERSE'
        dc.w     0
        dc.w     1          One function
        dc.w     codevec-#
        dc.b     7,'CODEVEC'
        dc.w     0
        end
```



```

100 REMark Sinclair QL World HEX LOADER v 3
120 :
150 CLS: RESTORE : READ space: start=RESFR(space)
160 PRINT "Loading Hex..." : HEX_LOAD start
170 INPUT "Save to file..." ;f$
180 SBYTES f$,start,byte : STOP
190 :
200 DEFine FuNction DECIMAL(x)
210 RETURN CODE(h$(x))-48-7*(h$(x)>"9")
220 END DEFine DECIMAL
230 :
240 DEFine PROCEDURE HEX_LOAD(start)
290 byte = 0 : checksum = 0
300 REPEAT load_hex_digits
310 READ h$
320 IF h$="*" : EXIT load_hex_digits
330 IF LEN(h$) MOD 2
340 PRINT"Odd number of hex digits in: ";h$
350 STOP
360 END IF
370 FOR b = 1 TO LEN(h$) STEP 2
380 hb = DECIMAL(h$(b)) : lb = DECIMAL(h$(b+1))
390 IF hb<0 OR hb>15 OR lb<0 OR lb>15
400 PRINT"Illegal hex digit in: ";h$ : STOP
420 END IF
430 POKE start+byte,16*hb+lb
440 checksum = checksum + 16*hb + lb
450 byte = byte + 1
460 END FOR b
470 END REPEAT load_hex_digits
480 READ check
490 IF check <> checksum
500 PRINT"Checksum incorrect. Recheck data.":STOP
520 END IF
530 PRINT"Checksum correct, data entered at: ";start
560 END DEFine HEX_LOAD
570 :
580 REMark Space requirements for the machine code
590 DATA 432
600 :
610 REMark Machine code data
620 DATA "43FA018A34790000","01104ED27001BBCB"
630 DATA "6714347900000112","4E9266385343667E"
640 DATA "3031E8006B7CC0FC","0028D0AE0030B0AE"
650 DATA "00346C6E20360800","6B68204045FA0018"
660 DATA "76FF70094E434A80","660A70284E434841"
670 DATA "70294E434E757200","1228004548411228"
680 DATA "004670004E7549EB","0010BBCC66304A33"
690 DATA "E808662A7A003A33","E80A6B22E78DDAAE"
700 DATA "00182F054BEB0008","61682A5F66123DB2"
710 DATA "8800D8002DB28804","D80470004E7570F1"
720 DATA "4E7570FA4E75614A","66F62230A6043801"
730 DATA "2A01671C383C081F","D281691453442A01"
740 DATA "70102205E1A16904","98402A01E24066F2"
750 DATA "720630790000011A","4E90226E00585D89"
760 DATA "2D4900582385E802","3384E80078027000"
770 DATA "4E75307900000116","4E9066A45343689E"
780 DATA "3031E80067083A00","4BE900027E207401"
790 DATA "C4808F31E8025289","534066F643F12802"
800 DATA "2D49005874007200","70024E412448206A"
810 DATA "0018202A001C262A","00203670A802D7C3"
820 DATA "BA33A800670A5088","B08662EE70F94E75"
830 DATA "1833A8018807B835","E80066EA3C055546"
840 DATA "6B18284D1833A802","8807528B528CB834"
850 DATA "E80056CEFF066CE","1230A80051016B08"
860 DATA "55016A0470004E75","70F44E750002FED8"
870 DATA "05414C494153FE76","07494E5645525345"
880 DATA "00000001FF020743","4F44455845430000"
890 DATA "","*",36114

```

LOOKUP reads its parameter as a SuperBasic string, to avoid problems with function names. The check on the value of D3, the number of string parameters, is only relevant when called from CODEVEC; ALIAS sets A3 and A5 to delimit a single parameter.

As written, LOOKUP searches for names in the tables of SuperBasic task (0,0). This suits Turbo and Supercharge, but users of QLiberator and Minerva 1.8x, which create extra name tables, might want the scan to examine the current task.

To achieve this, remove the five lines that

point register A2 at task (0,0) and replace subsequent references to A2 with A6, the current task base. This entails changes to eleven operands, and one comment. The resultant code is ten bytes shorter. The DIY disk includes both implementations.

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PSION SOLUTIONS

I've just come a cropper with Quill (v 2.3). I realise it wouldn't have happened had I backed up files but even so it looks like a serious bug to me.

If one tries to save a `_doc` file with an existing filename one is asked whether the old file is to be deleted. Pressing `<ESC>` returns one to the original prompt, for example 'Save `flp2_letter.doc`'. If one then attempts to save the file by overwriting this prompt by typing in, say, 'letter2' Quill takes no notice but deletes the original file and saves the new one with the old name.

Hilary Snaden
Portishead
Bristol

I can confirm that this happens with both versions I have available too (QLWP 2.1 and Quill 2.35). Hilary Snaden's careful observation explains the loss of more than one of my files! There seems to be no way to cure it without modifying the code for Quill itself, so it just has to be lived with. The only answer if you change your mind while saving is to remember to press `<ESC>` TWICE and then repeat the entire save sequence with the new name.

Bugs

This is probably an opportune introduction to a catalogue of other bugs and inconveniences in Quill. There is another serious bug in all versions: if you use the Erase or Copy functions the program partially loses track of cursor movements. Pressing `<SHIFT down-arrow>`, which usually moves the cursor to the start of the next paragraph, has an erratic effect. More seriously, repeated use of `<up-arrow>` may lock up Quill altogether without warning. In my experience it is only `<up-arrow>` that causes the problem and it is only Quill that is locked, not the whole QL, so if you are

Why does Quill V2.3 take the law into its own hands when you ask it to save a new file under an existing file name? Why won't the Psion suite save one reader's files to disk? Howard Clase catalogues some Quill bugs, looks at Ron Massey's alterations to `install_bas`, and offers a modification to his own program FTidy.

multitasking you can still get at your other programs, ramdisk files, etc.

Pointers

Contrary to some advice I have read, you cannot reset the pointers by going to the top or bottom of the `_doc`. You can avoid using up-arrows by using `<SHIFT up-arrow>` to get to the top of the paragraph and coming down line by line, but it's probably safer to save and reload your document after using either of these two commands as I always do. If you can use *Toolkit II* to generate 'macros', this only involves a couple of keystrokes. Note: It's the reloading that resets the pointers; you cannot get away with saving alone if you are going to do any more work on the file.

Printer

Another way to lock up Quill, and your printer port as well, is to ask Quill to print something without having a printer ready and waiting at the other end of the printer cable. The `<ESC>` key has no effect in these circumstances. If it is just a case of pressing the on-line button on the printer, then the situation is recoverable, but switching on a printer or plugging in

a printer cable while the QL is running, risks a chip-destroying surge. That said, I sometimes do switch on my printer after the QL, but I have taken care that it is plugged in to a different main circuit. That hasn't prevented my wife from starting up the Electrolux on the same circuit as the QL, but without causing any problems – so far!

There are a few other quirks of Quill that beginners may come across, which, while they aren't absolute disasters, can be frustrating if you don't know what is going on.

Headers

Firstly headers and footers. The default settings when Quill is switched on are: no header, and a footer that prints 'page 1', etc. at the bottom centre of each page. Unfortunately the default page design expects the top of the sheet to be at the print head, not at the tear off bail, which is where it is convenient to put it. This means that if you are using form feed paper, 'page 1' appears not at the bottom of page one, but at the top of page two. You can get around this by putting the perforation at the print head – but this means wasting one sheet every time you print a letter.

My personal solution to this is to get into 'Design' `<F3,D>`

and set the upper margin to 0 and the bottom margin to 9. This is about right for the top of the sheet at the bail. I also prefer to have my page numbers at the top rather than at the bottom, so I set the footer to "none" and the header to "nnn", which prints the page number in ordinary Arabic numerals.

Footer and header work similarly: after you have decided whether you want your message left, right or centre you are presented down at the bottom left corner of the screen with the present message if there is one, otherwise the line is blank waiting for you to type it in. The enhanced Psion line editor I mentioned in an earlier article is available, so you can use `SHIFT` with the arrow keys, etc. If you include "nnn" in your message it is replaced by the page number in Arabic numbers. ('rrr' gives Roman numerals and 'aaa' alphabetical labelling – upper case, eg 'NNN', has the same effect. You have to type them in, not say them.)

Bold

The last question asked when you are resetting footers or headers is 'bold'. While Quill is able to remember the position and content of your message it seems to suffer from amnesia when it gets to the typeface – so you have to press 'n' every time

if you don't want your header in the default **bold** type.

This leads me to another problem which I met when I had a fading ribbon and tried to compensate by printing a whole article in bold type. Quill thinks 'normal' is whatever the main text is in, and doesn't send any typeface codes to the printer when printing header and footers, but I had set the header to bold. The result was that, having printed the header in bold, it sent the code to turn bold off, and the main page came out in normal type. When I set the header to 'normal' it didn't change the typeface and everything came out as I wanted it – all bold! You've just got to look at things the way Quill sees them.

Def_tmp files

I'm writing this while on a short sabbatical in England using a basic 128K QL and a tv set. Perhaps all contributors should do this from time to time, since I've discovered another annoyance that I never would have met on my 640K disk drive QL at home (NB Ms Editor, that's Newfoundland, not Nova Scotia). *Let's just say Canada.* The code for Quill itself takes up so much memory in the QL that there is only enough room for about 700 words left on an unexpanded QL, so when this is full Quill sets up a special file, `def_tmp`, on `mdv2_`. It keeps the whole of your text in this and only keeps the bit you seem to be currently interested in in the active memory (in computerese, it uses the `mdv` tape as virtual memory).

Merging

This can slow things down, while the `mdvs` whirr as you move about your document, so I am trying to write my article in short bits, only merging them together when everything is finished. Obviously, since the tape in `mdv2_` contains part of your doc, you cannot take it out to save a second copy as a backup, but you can take out the Quill tape from `mdv1_` and make a copy on that microdrive. (Remember to

put the Quill tape back before you print.) When you leave Quill with quit, or zap a file, it should delete the `def_tmp` file. However, if you load a new shorter file without 'zapping' the original doc then the `def_tmp` file remains on your cartridge taking up unnecessary space. You can delete it from within Quill using the 'files' command `<F3,F3,F,D>`; for once Quill seems to be intelligent enough to allow this only if the `def_tmp` file is not part of your current doc.

If you do forget, and try to change cartridges in `mdv2_` while there is an active `def_tmp`, Quill doesn't give you a gentle reminder, it says: "Fatal error – restarting Quill", and your document is lost. Even though it seems to be starting again from scratch it gets very possessive about the original cartridge and won't accept any other – it's best to reset at this point.

Configured or confused?

Mr Raymond Fowles of Liverpool has upgraded his QL to disk, but is having problems getting his Psion suite to run on his new system. In particular he has been unable to save any of his files to disk.

Mr Fowles' problem arises because each of the Psion programs has a number of 'default' devices built into its software. If you are still using the original versions, you will probably have noticed that when loading or saving a file in any of the Psion suite you do not have to tell it which microdrive to use as you do in Basic. It just assumes you mean `mdv2_`; although you can over-ride this default by typing the device name before the filename, eg if you type in "`mdv1_letter`" it will save it to `mdv1_`. (I wouldn't recommend this as a regular habit, as there isn't very much extra room on the Quill cartridge.)

Whirr

Also if you ever need help or want to print a document you will notice `mdv1_` whirr for a bit before anything happens. It is because of the built-in de-

faults in the code that Quill knows where to look for the appropriate files.

If you put your Quill cartridge into `mdv1_` after pressing `F1/F2` and type "`copy mdv1_quill to scr_`" at the keyboard you will see the code for Quill spew out onto your screen; most will be gobbledygook, but occasionally recognisable words will appear, and amongst them you will see `mdv1_`, `mdv2_`, `mdv1_` in close succession. If you have an (or even THE) editor or a monitor you will be able to find them more easily and even alter them, for this is where the names of the defaults are hidden.

Config_bas

There is no need to spend money on an editor: though; there is a program called `config_bas` supplied with the Psion suite. In fact there are no less than three identical copies of it, one on each master, apart from Archive. You can use any copy to configure any member of the suite. As far as I can see there is no significant difference in the various versions of `config_bas` that come with the different versions of the Psion suite, but, if, like me you have more than one version, it is probably safest to use the right one – I haven't tested them all exhaustively.

Reconfigure

To re-configure your copies of the Psion suite, first reset your QL and press `F1/F2` before inserting your Psion cartridge into `mdv1_`. Then enter the command "`LRUN mdv1_config_bas`". In operation `config_bas` is easier to use than `install_bas`; just follow instructions. First it asks you for the name of the program you want to configure and where it can be found (`mdv1` and `mdv2` are the only options, so you will have to copy your reconfigured program to disk later). You can reset the default devices for all four Psion programs and for Abacus and Archive there is the additional option of changing the sort

order – I'll come to that later.

The three device defaults in order are:

1. The device that contains 'system information'; in practice this means the location of the printer drivers – `printer_dat` or `gprint_prt` in the case of Easel.

2. Where you keep data files: eg `_doc` files in Quill or `_aba` files in Abacus.

3. The location of the `_hob` files which are called up when you press `<F1>` for HELP!

Dual Disk

If you have a dual disk system then the obvious thing is to simply swap `flp1_` for `mdv1_` and `flp2_` for `mdv2_`. If like me, you have only one disk drive then you can either set all three devices as `flp1_`, or use a ram-disk as I do. I set the 'system' device as `ram8_`, and have altered my boot to copy the appropriate `_dat` file to `ram8_printer_dat` before EXEC'ing the Psion program. I have differently named `_dat` files for different purposes and use the backup facility, `<F3, F3, F, B>`, if I want to change `ram8_printer_dat`. N.B. it must always be called `printer_dat` in `ram8_` whatever it's called on the disk – you can change the name when you copy or back it up.

If you run `config_bas` with Abacus or Archive you can also change the sort order, ie the alphabetical order used when strings are sorted. If you are using English only then you probably won't want to change it. This facility is primarily made available for users of other languages which use other sequences – for example, in German a-umlaut is treated as equivalent to a, but in Finnish it comes almost at the end after z, but before o-umlaut, and w and v are considered equivalent. (This might come in useful if you are ever using the Helsinki phone directory!)

There is an alternative way of dealing with running the Psion suite on disks – or any other programs that have built in references to microdrives – and that is to use the `FLP-USE` command which is present in almost all disk interface software. Edit your boot to include

PSION SOLUTIONS

the following line before any reference to mdv is made:

nnn FLP_USE MDV (where nnn is an appropriate line number.)

This statement makes 'flp' an alias for 'mdv' so an instruction to look for a file on mdv2_ is redirected to flp2_ for example. I prefer to call a disk a disk and not to indulge in euphemisms of this kind, as you can get into a muddle. Obviously you can only do this without using config_bas if you have dual disk drives, and you will cut yourself off from access to your microdrives themselves.

One More

Mr Fowles also refers to some alterations to install_bas proposed by Ron Massey in *QL World*. It is not necessary to do anything to install_bas when you convert to disks, just copy over the printer_dat files and they will work as they are. Install_bas enables

you to design your own printer_dat files which the program refers to when it needs to know the special codes your printer uses to create effects like superscript, bold, etc.

Alterations

Ron Massey's alterations represent one approach to solving the problem of wanting to pick and choose between different versions of printer_dat for different situations – especially when you have more than one of the Psion Suite on the same disk. I go along with him as far as giving each version a distinctive name, but you can do that with the COPY command eg COPY mdv1_printer_dat to flp1_Quillnlq_dat.

His approach also involves altering the code of your Psion programs, and you cannot do that without an editor or some skill at writing SuperBasic. Even if you do follow his suggestions your new version is still restricted to one named _dat file. Using the backup facility in the

way I describe above is more flexible and doesn't require any alterations except a bit of re-naming of printer_dat files.

The main trouble with both config_bas and install_bas is that both are designed to operate with microdrives alone so you have to modify or create your files on microdrives and transfer them to disk, or use the FLP_USE command. It only requires a small amount of editing to make disk versions of these programs. I will investigate and report in a future article.

FTidy bug

Some readers have been having problems with a file handling program of mine called *FTidy* which was available through QL World's smdv exchange. This was primarily intended for QLers with disk drives and requires a small alteration to run on a QL with microdrives only. In order to manipulate the directory it has to be read into a temporary file, and the program as supplied tries to put this onto flp1_. To

use FTidy with microdrives load the program FTidy_bas and type EDIT 640, you should get a line starting:

```
640 DATA "FLP1_":REMark...
```

Edit this to read:

```
640 DATA "MDV1_":REMark...
```

and press enter. Delete FTidy_bas from your working cartridge and save this modified version as FTidy_bas in its place. You should have no further problems, as long as there is a tape in mdv1_ with enough space for a short file – two sectors is probably enough. If you do have a ramdisk then use this rather than mdv1_, it is much quicker. If you still have problems then please write to me c/o Sinclair QL World.

This only applies to the original SuperBasic version of FTidy. A Q Liberated version, with a superbasic program to enable you to configure the devices has been sent in to the new microdrive exchange, but administrative problems have prevented it from appearing yet.

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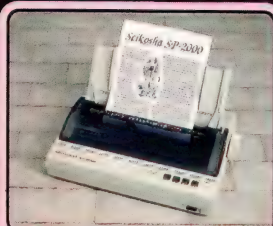
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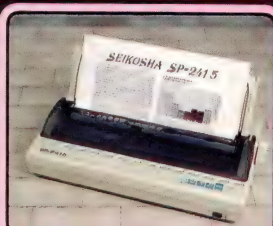
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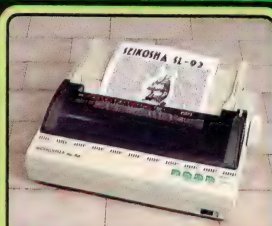
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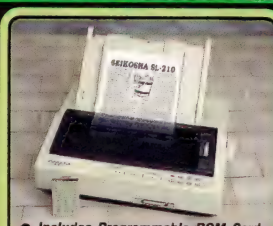
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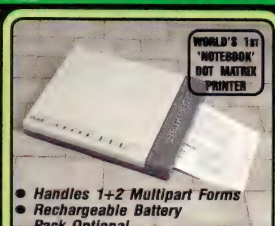
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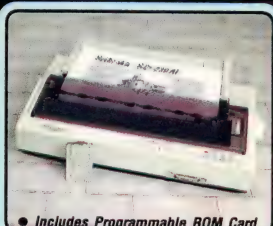


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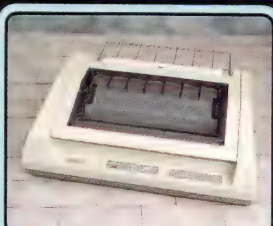
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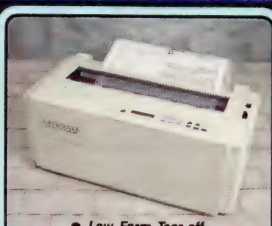
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ARCHIVE

$$A = N + S - W = E + R - S$$

Archive's numerical abilities are really quite impressive. Numbers are stored to 14 significant floating point figures, to a maximum value of some 1.7E38 – by my reckoning that is plus or minus 170 billion billion billion!

The downside of this powerful feat is that Archive numbers still occupy enough space for such numbers (8 bytes), even if all you want to store are numbers between 1 and 10, or even just to store a zero. That does not matter on a small database, but in applications where large amounts of small numbers are involved, it can represent a huge waste of both computer memory and disk/microdrive space.

Another problem with Archive numbers is the inability to define arrays or sets of any sort. Each number has to be held in a variable of its own. This presents all sorts of problems, both in terms of the awkwardness of this kind of data handling, and in the inefficiency of space it can lead to. When devising a new record structure, you have to allocate every number variable you may need – even if in most of the records, it will be carefully storing zero to fourteen significant floating point figures.

This *Archive Answers* will not be a finished application. Instead it offers the Archive programmer several alternative sets of tools to help overcome this situation. They represent several different data structures, each of which may improve

Robin Stevenson offers the Archive user several alternative tools to assist number-handling.

these string integers, and back again. As with all *Archive Answers*, input into a procedure is via calling parameters, and output is via global variables: ANSWER for string, and ANSWER for numeric output.

Once the numbers are held as string values they can be concatenated together, so that one string variable can be used to hold up to 127 such values. Once in such a string variable, these numbers are very easy to deal with *en bloc*. It is easy to

Table One. Which procedures are needed by each data structure?

| proc struc | Encode | Decode | Array Dim | Array Store | Array Get | Push | Pop | Pull | Array Insert | Array Cut |
|-----------------------|--------|--------|-----------|-------------|-----------|------|-----|------|--------------|-----------|
| Fixed Length Array | Y | Y | Y | Y | Y | | | | | |
| Variable Length Array | Y | Y | | Y | Y | | | | Y | Y |
| Stack | Y | Y | | | | Y | Y | | | |
| Queue | Y | Y | | | | Y | | Y | | |

both the data access and data storage for particular kinds of problems. The data type used will be integers (whole numbers) in a range of plus or minus 36000 or so. This can be stored in two bytes of a normal text string. The two short procedures in **listing one** convert Archive numbers into

duplicate the whole set, by simply assigning it to another variable. You can also find the total number of elements, by simply dividing its length by two. And because Archive uses variable length string variables, they only occupy the space they need. What is not so easy is dealing with

Listing One

```
proc Encode;VALUE
  let VALUE=VALUE+32639
  let ANSWER$=chr(VALUE/256)+chr(VALUE-(int(VALUE/256)*256))
endproc
```

```
proc Decode;ITEM$
  let ANSWER=(code(ITEM$(1))*256)+code(ITEM$(2))-32639
endproc
```


Listing Two

```

proc ArrayDim;ELEMENTS
  let ANSWER$=rept(chr(127),ELEMENTS*2)
endproc

proc ArrayStore;ARRAY$,ELEMENT,VALUE
  local LENGTH: let LENGTH=len(ARRAY$)/2
  if ELEMENT<=LENGTH and ELEMENT
    Encode;VALUE
    if LENGTH=1: return : endif
    if ELEMENT=1: let ANSWER$=ANSWER$+ARRAY$(3 to )
    else
      let ANSWER$=ARRAY$( to (ELEMENT*2)-2)+ANSWER$
      if ELEMENT<LENGTH
        let ANSWER$=ANSWER$+ARRAY$((ELEMENT*2)+1 to )
      endif : endif
    else : print "ArrayStore: element out of range"
    let ANSWER$=ARRAY$: endif
  endproc

proc ArrayGet;ARRAY$,ELEMENT
  if ELEMENT*2<=len(ARRAY$) and ELEMENT
    Decode;ARRAY$((ELEMENT*2)-1 to )
    else : print "ArrayGet: element out of range"
    let ANSWER=0: endif
  endproc

proc Show;ARRAY$
  local LENGTH,COUNT: let LENGTH=len(ARRAY$)/2
  let COUNT=1: while COUNT<=LENGTH
    ArrayGet;ARRAY$,COUNT
    print COUNT;" ";ANSWER
    let COUNT=COUNT+1: endwhile
  print "An array of ";LENGTH;" elements."
endproc

proc ArrayTest
  local COUNT:ArrayDim;10: let A$=ANSWER$
  print "Enter numbers between 1 and 10. 0 to finish"
  let COUNT=1: while COUNT<>0
    input " ":COUNT
    if COUNT
      ArrayGet;A$,COUNT
      ArrayStore;ANSWER$,COUNT,ANSWER+1
      let A$=ANSWER$: endif
    endwhile
  let COUNT=1: print "Frequency:-"
  Show;A$
endproc
    
```

the individual elements. The procedures developed here help overcome this in various ways. With the appropriate data-handling procedures, the strings can be treated as a variety of different data structures.

The simplest is probably the fixed length array, which always contains a fixed number of element values. More space

efficient options include a stack – in which numbers can be added or removed from the top of a list – and a queue, adding to one and removing it from the other. The most flexible, but also the trickiest to keep under control is the variable length array. Data can be read, inserted or deleted from any point, and there is no need to waste storage space.

Each of these data structures has its benefits and limitations. It is important to match an application with the appropriate data structure, to maximize the benefits, and minimise the shortcomings.

The savings to be gained could be considerable. If you need to store 50 numbers per record, in 200 records, this would occupy some 80K by conventional means, and only 20K in fixed length arrays. If you needed up to 50 numbers per record, but on average only used 10 of them, it would still take 80K normally, while variable length arrays would use not much more than 4K.

Using structures

We shall now look at the nitty gritty of using these data structures. *Encode* and *Decode* do the maths of converting numbers to two-character strings and back, and are needed for all of the data structures. However you may never need to call these directly. Each data structure uses its own set of storing and extraction procedures, which obey a set of rules specific to the particular structure. While such rules can limit what any one array can do, they make the programming very much simpler. When designing the system, choose a data structure suited to the task and stick to it. In this way, you can actually gain more freedom in the use of the data, since you can be sure of what is going on. It is one of the paradoxes of programming, as of life, that as options (and so complexity) increase, so the effective freedom of choice tends to decrease.

The first data structure we shall look at is the fixed-length array. There are three procedures needed here: *ArrayDim* to dimension the array; *ArrayStore* to store numbers; and *ArrayGet* to retrieve numbers. The basic rule for a fixed-length array is (surprise, surprise) that you can't change the number of elements. When you dimension the array, you fix its length, and each element is assigned the value zero. This means it is quite legal to retrieve elements that have not had a number stored in them. The first three procedures of **listing two** perform these three tasks. The remaining two are demonstration procedures. *Show* will display the values held in any array passed to it. *ArrayTest* is a simple demonstration of one use of a fixed-length array. In this instance, there are ten elements in the array, and you are requested to enter as many values between 1 and 10 as you like. For each entry, the existing value for that element is read, added to, and restored. In this way it monitors the frequency of each number pressed.

In this example it is important that all the elements start off initialised at zero, so they can be added to, even on the first call. It is also useful to be able to deal with each element by number. The procedure doesn't

ARCHIVE ANSWERS

need to know which number was pressed. It can simply pass it on when getting and storing the frequency. One important point to note about these array strings is that they are not automatically put into your array variable. ArrayTest stores its array in A\$. If you look at the occasions this is used, you will see that while you can pass A\$ to a procedure (as in ArrayGet;A\$, COUNT), it cannot pass it back. Instead the revised array is now in ANSWER\$, which must be re-assigned to A\$ (let A\$=ANSWER\$). This must be done after any procedure which alters the array. In this case that means ArrayStore and ArrayDim. It is an unfortunate weakness with Archive parameters. Also note that if A\$ was a file variable, instead of a memory variable, you would also need to use the UPDATE command to make the change to A\$ permanent.

There are many occasions when fixed-length arrays could be useful. Anything where a fixed amount of data arrives in a variable order is ideal. For example, your students each have six essays to do during the term. You could set up a database with a six-element array for each student record, each essay title corresponding to a number. As the essays are marked you could store the values against the relevant essay number. It would be fairly easy to devise procedures to search for unmarked essays (hopefully no student will get 0 percent as an actual mark), and to add up the totals for each student.

The stack

The next structure we shall look at is the stack. This is used a lot in low-level programming, and also in Forth, where it is the main data feature. The idea behind it is that elements can only be added to the top of the stack, or taken off the top (like a stack of plates in a cafeteria as the tutorials always say). Archive users are unlikely to want a multipurpose stack of the kind used in Forth, so rules to control stack use by different parts of a program probably don't apply. By limiting access to nothing but adding and removing, the programming is very simple, and it is very easy to keep track of the data.

The stack is accessed entirely by two procedures, *Push* and *Pop* – the traditional names given for adding and removing values. A stack is one of the simplest but also most limiting of data structures.

Similar in both form and use is a queue. The difference is that values are extracted from the bottom, instead of the top of the list. It is a first-in-first-out system. The procedures for a queue are *Push* (the same as for the stack) and *Pull* which removes the bottom value. One use for a queue might be to co-ordinate a real queue in a doctor's waiting room. As patients arrive, their IDs are added to one end of the queue. Then each ID can be taken from

Listing Three

```
proc Push;ARRAY$,VALUE
  if len(ARRAY$)<253
    Encode;VALUE
    let ANSWER$=ARRAY$+ANSWER$
  else : print "Push: stack full"
  let ANSWER$=ARRAY$: endif
endproc

proc Pop;ARRAY$
  local LENGTH: let LENGTH=len(ARRAY$)
  if LENGTH>=2
    if LENGTH=2:Decode;ARRAY$: let ANSWER$=""
    else :Decode;ARRAY$(LENGTH-1 to )
    let ANSWER$=ARRAY$( to LENGTH-2)
    endif
  else : print "Pop: stack empty"
  let ANSWER$="": endif
endproc

proc Pull;ARRAY$
  if len(ARRAY$)>=2
    Decode;ARRAY$
    if len(ARRAY$)=2: let ANSWER$=""
    else : let ANSWER$=ARRAY$(3 to ): endif
    else : print "Pull: queue empty"
    let ANSWER$="": endif
  endproc

proc QTest
  local COUNT
  print "Enter numbers +/-32600, ending with 0"
  let FIFO$="": let COUNT=1: while COUNT<>0
    input ": ";COUNT
    if COUNT
      Push;FIFO$,COUNT: let FIFO$=ANSWER$
    endif
  endwhile
  let LIFO$=FIFO$
  print "The numbers were: -"
  print tab 5;"FIFO"; tab 20;"LIFO"
  while len(FIFO$)
    Pull;FIFO$: let FIFO$=ANSWER$
    print tab 5;ANSWER;
    Pop;LIFO$: let LIFO$=ANSWER$
    print tab 20;ANSWER
  endwhile
endproc
```

the front of the queue, to show who is next, and then automatically posted in the consultation record.

Either of these structures would also be ideal for any occasion where an unknown

number of values need to be gathered, before being used to produce statistics. For example, an athletics event may wish to record lap times for each runner, in each race. Each runner's record would

Listing Four

```
proc ArrayInsert;ARRAY$,ELEMENT,VALUE
  local LENGTH: let LENGTH=len(ARRAY$)/2
  if ELEMENT<=LENGTH+1 and ELEMENT
    Encode:VALUE
    if ELEMENT>1
      let ANSWER$=ARRAY$( to (ELEMENT*2)-2)+ANSWER$
    endif
    if ELEMENT<=LENGTH
      let ANSWER$=ANSWER$+ARRAY$( (ELEMENT*2)-1 to )
    endif
    else : print "ArrayInsert: out of range"
    let ANSWER$=ARRAY$: endif
  endproc
```

```
proc ArrayCut ;ARRAY$,ELEMENT
  local LENGTH: let LENGTH=len(ARRAY$)/2
  if ELEMENT<=LENGTH and ELEMENT
    Decode;ARRAY$( (ELEMENT*2)-1 to )
    if ELEMENT>1
      let ANSWER$=ARRAY$( to (ELEMENT*2)-2)
    else : let ANSWER$="": endif
    if LENGTH>ELEMENT
      let ANSWER$=ANSWER$+ARRAY$( (ELEMENT*2)+1 to )
    endif
    else : print "ArrayCut: out of range"
    let ANSWER$=ARRAY$: endif
  endproc
```

```
proc Prune;ARRAY$
  local T,COUNT
  let COUNT-2:ArrayGet;ARRAY$,1: let T=ANSWER
  let ANSWER$=ARRAY$
  while COUNT<=len(ANSWER$)/2
    ArrayGet;ANSWER$.COUNT
    if ANSWER=T:ArrayCut;ANSWER$,COUNT
      else : let COUNT=COUNT+1: let T=ANSWER
    endif
  endwhile
endproc
```

```
proc InsertTest
  local N,COUNT: let A$=""
  print "Enter numbers, +/-32000. End with 0"
  let N-1: while N<>0
    input ": ";N
    if N
      let COUNT=1: let ANSWER=-40000
      while COUNT<~len(A$)/2 and N>ANSWER
        ArrayGet;A$,COUNT
        if N>ANSWER: let COUNT=COUNT+1: endif
      endwhile
      ArrayInsert:A$,COUNT,N: let A$=ANSWER$
    endif
  endwhile
  Show;A$
  Prune;A$: let A$~ANSWER$
  Show;A$
endproc
```

include a stack, into which was added each lap time. At the end of the race, it would be possible to find the fastest, and average laps of each runner, and use the same system for races of different lengths.

Listing three contains the stack and queue procedures, plus a demonstration. This shows how the same data, once collected, can be used as either a stack or a queue, as needs require.

The final data structure offered here is the variable-length array. This uses both `ArrayStore` and `ArrayGet` from **Listing two**, adding procedures to insert and delete values anywhere in the list. It has no inherent rules in the way the others do, and is clearly of less use when the absolute position of the elements is important. However it is ideal where the relative value is significant. For example, you could insert each new number in ascending rank order, as demonstrated by the `InsertTest` procedure in **Listing four**. Once numbers are in order it is very easy to check for duplicated values. The `Prune` procedure does just this, and prunes out any duplicates it finds.

One important, but complex use for an array could be in a one-to-many relational database. Records in the main data file could store an array of reference numbers, for each of the subsidiary file records that relate to it.

When entering the listings initially, you should add all four together into one program, as there are overlaps in the procedures they require. However when you come to use them in your applications, you could remove those you do not require, for the particular structures you need. **Table one** shows which procedures relate to each of the data structures described.

A word of warning may be in order regarding printing these array strings on the screen. Because they may include values below `CHR(32)`, they can interfere with the screen driver and write rubbish, or generate error messages. This is true even with a file variable using `DISPLAY`. You may need to customise the input screen, to remove such variables.

It would be fairly easy, by just altering the `Encode` and `Decode` procedures, to convert all these procedures to handle a different set of integers. If zero was positioned at true zero, instead of at 32639, you could store numbers from 0 to 65000 instead. If only very small numbers were needed, you could, with rather more wide-ranging changes, use a single byte for each number, to store integers from 0 to 255, for example. This would halve the storage area used.

There is also scope for using other data structures, or access rules from those described here. Archive programmers are probably not used to thinking in terms of bytes of data, or required integer ranges. The vastness of the built-in numeric variables shields us from that. However if your applications are too inefficient using these variables, the integer arrays described here could be the answer you need.

NOTICE BOARD

LOST LISTING

First, apologies. The listings of DBQL across the centre of pages 46 and 47 of the October issue are illegible. The setter's pagemaker program apparently swallowed the listings across the gutter and refused to give them back. The subsequent scan of the backup listing failed to print properly.

There are moments when some bits of paper and a sharp scalpel look like the answer to modern technology.

We have not been able to make contact with Mr Tom Ashcroft (who is innocent of all blame for this blunder) in time to re-run the damaged section of the listing this month, but when it arrives we will send a copy out to anyone who drops us a line. We may also re-run the damaged column for readers further afield.

ENCORE

A line was also dropped out of Simon Goodwin's DIY Toolkit in October. We don't know what the official excuse is, but the correction appears in this month's QL Scene.

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writing, quoting your ubiquitous subscriber number.

It is not often that I ask for volunteer labour on QL World. One person chained in ceaseless slavery seems like enough. However, the expertise on the QL is now so scattered, and so up to its individual and collective neck in new developments of one sort or another that I am having difficulty pinning it down when I want it.

One upshot of this is that I can't get useful replies to stuck readers' queries (what we used to call Technical Helpline) fast enough to be really useful. The emigration of Ron Massey has likewise left us without a reliable all-rounder on the Psion suite. Ron used to digest queries and turn them round to us every month. Few of the knowledgeable people have the time or the across-the-board knowledge to do that, even on a good page rate.

What I would like to compile is a list of people who are experienced or good in one particular area (or two or three if they are that way inclined) who would be willing to take the occasional letter from us and work out a reply to it to get somebody out of a jam. Some of us do this on an informal basis already, but we have not enough spare capacity to run a regular page of problem solving beyond what Bryan can handle in Troubleshooter.

I may even take to publishing a short list of enquiries on a page of its own by way of an ongoing and general appeal for assistance.

One of our purposes is to help people with difficulties, and we could do this more effectively if we had more people to call on.

THE OTHER THING WE NEED, for all the same reasons and perhaps with greater urgency, is a handful of volunteers to try out and report back on programs sent to us for publication.

Write to me if you can help or if you want more information.

THE EDITOR

THE PREMIER MAGAZINE



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ArchEd Part II

Stephen Mitchell continues with the second part of his Archive editor.

In the last article we produced some file handling procedures that will enable you to link your dbf file to the ArchEd editor procedures that appear this month. This Editor runs within Archive and enables you to edit the fields of your file to their full 255 character length. ArchEd will handle a file containing any number of fields without the need to create special sedt screens. Arch Ed can also be incorporated within your existing Archive procedures. Nearly all this month's procedures are prefixed by the letters w2. Type in the procedures given in the listing using the Archive edit command and save it with the name given in the initial REMarks. Make sure you keep a security copy.

The task of the w2 procedures is to display each field in turn from the record selected by the file handling procedures and to enable individual fields to be edited as required.

Before proceeding it is necessary for the w2g1 procedure to be edited to the names of the fields in your file. A non-elementary file structure is given as an example in procedure w2g2. The parameter 'n' to this procedure simply indicates which field is to be assigned to the string variable s\$. The fields of a file are numbered from zero, so if the fifth field of your file is called 'descriptions\$' its field number is 4 and so is the statement:

```
if n=4: let description$=s$: endif
```

must be included in w2g1. A statement of this form must appear for each of the textual fields in your file with the field numbers set as appropriate. The example shows how to code this structure in a reasonably efficient manner. Note that a gap will be present for any numeric field defined in your file. The w2g2 procedure can be deleted once w2g1 has been amended to reflect your file.

As mentioned last month, if you have an expanding QL then you might like to try merging the editor and file handling procedures and running them as a single loadable program. ArchEd runs somewhat more efficiently in this form.

ArchEd is run in the normal way by typing 'run ArchEd ENTER'. The initial questions asked are those from the file handling procedures with which you should by now be quite familiar. When you have selected a record from your file

you will be asked 'Do you want to EDIT this record?'. If the answer is 'yes' ArchEd will display the first textual field of the record. This field becomes the 'current' field and appears double-lined spaced at the top of the screen. The individual lines into which the current field is broken are known as 'components' and it is these that are edited by the sub-edit commands (see below). Of course, the field may be shorter than the component length in which case only one line is displayed. The current field is followed by the next field (if this is textual) single-line spaced. The following editing instructions are displayed at the bottom of the screen:

ENTER: Edit field (i/d/r/di=insert/delete/replace/del & ins); (SHIFT) 1,2, ..., 10: Accept field edit ord skip (-)n fields (cyclic); F4/F5: Abandon/Commit all field edits to current record and Exit; Rp Space

enter: re-edit current field when at next component; <3 SPACES>: Accept field edit when at next component.

Again, these are mostly self-explanatory but the sub-editing commands require further amplification by way of some examples.

To perform any editing on the current field you must press ENTER. This causes the cursor to appear under the first character of the first component of the current field. This left-hand end of the component is designated as the reference point and the sub-edit command is applied relative to this point. It is possible to delete, insert or replace characters within the component. For instance, consider the following component text:

All in a hott and copper sky.

To correct the spelling mistake type 12

```
proc start
  REM Save this listing as 'ArchEd3.prz'.
  w2aled
  run "ArchEd2"
endproc
proc w1z2head
  print at 0,0: paper 2;" A R C H I V E   E D I T O R ";
  print rept(" ",mod*3);"Memory ";memory();" Bytes"
  if memory()<1200
    print at 1,mod*3;"**WARNING** Memory low - Close & backup file!"
  endif
endproc
proc w2aled
  REM "ARCHIVE EDITOR - 'ARCHED' Version 2.02 3/5/91"
  REM Copyright S.G.Mitchell
  local ln,i2,m,n,ft,z,upd,gol
  let i2=0
  let n=0
  let ft=numfld()
  while n<ft
    let m=n
    if fieldt(n)
      let s$=fieldv(n)
      let upd=0
      let gol=1
      while gol
        cls
        ink 4
        w1z2head
        print at 19,0: ink 2;"ENTER": ink 4;": Edit field ("
        print ink 2;"i/d/r/di": ink 4;"=insert/delete/replace/del&ins);"
        print at 20,0: ink 2;"(SHIFT)1,2,...": ink 4;"1": ink 2;"0":
        print ": Accept field edit & skip (-)n fields (cyclic);"
        print at 21,0: ink 2;"F4/F5";
        print ": Abandon/Commit all field edits to current record & Exit;"
        print at 22,0:"RP ": ink 2;"SPACE ENTER";
        print ": Re-edit current field when at next component;"
        print at 23,0:" ": ink 2;"SPACE SPACE ENTER";
        print ": Accept field edit "" "" "" "" .";
        ink 6
        let line=1
        w2elzm
        w2bldisp:n,s$,1
        w2f1zn
        if n+1<ft
          if fieldt(n+1)
            let ln=line
            let line=line+mod-6
            w2bldisp:n+1,fieldv(n+1),0
          .
        .
      endwhile gol
    endif
    let n=n+1
  endwhile
endproc
```



```

        let line=ln
        endif : endif
    print at 18,0;" "
    let z=0
    while not z
        let z=code(getkey())
        if z=30
            w2oledit;2
            w2dias
            if s$=fieldv(n)
                let upd=0
            else
                let upd=1
            endif
            if p3 or s$=" "
                let g01=0
                if n=ft-1: let m=-1: endif
                endif
            else
                if z=22
                    let g01=0: let m=ft
                else
                    if z=21
                        let g01=0: let upd=0: let m=ft
                    else
                        if 47<z and z<58
                            let g01=0
                            if z=48: let z=58: endif
                            let m=n+z-49
                            if m>=ft-1: let m=m-ft: endif
                        else
                            if z=33 or z=64 or z=35 or z=36 or z=37 or
                                z=94 or z=38 or z=42 or z=40 or z=41
                                let g01=0
                                if z=33: let m=n-2: endif
                                if z=64: let m=n-3: endif
                                if z=35: let m=n-4: endif
                                if z=36: let m=n-5: endif
                                if z=37: let m=n-6: endif
                                if z=94: let m=n-7: endif
                                if z=38: let m=n-8: endif
                                if z=42: let m=n-9: endif
                                if z=40: let m=n-10: endif
                                if z=41: let m=n-11: endif
                                if m<-1: let m=ft+m: endif
                            else
                                let z=0
                            endif : endif : endif : endif : endif
                        endif
                    endwhile
                endwhile
                if upd:w2glaf;n: let i2=1: endif
                endif
                let n=m+1
            endwhile
            if z=21 and i2: back : next : let i2=0: endif
            if i2: update : endif
            w2e1zm
            w2f1zn
            let s$=""
        endproc
    proc w2bldisp;x,x$,a
        local f11,k,m,n,q,l,lp,x1$
        let f11=f1-1
        if a: let p4=1: let q=2
            else
                let q=1
            endif
        print at line,0: ink 4:fieldn(x)+":":
        let lp=len(x$)
        if lp=0: let x$=" ": let lp=1: endif
        let m=1
        while m<=lp
            let n=m
            if n+f11>lp
                let l=lp-n
                let x1$=x$(n to n+1)
                print at line,col:x1$
                let line=line+2
                if a
                    w2b2am;p4,x1$
                    let p4=p4+1
                return
            endif
            let l=f11
            if x$(n+1)<>" "
                while x$(n+1-1)<>" "
                    let l=l-1
                endwhile
                let m=n+1
                let l=l-1
            else
                let m=n+1+1
            let k=lp
            while m<=k
                if x$(m)=" ": let m=m+1
                    else : let k=m-1: endif
                endwhile
            endif
            while x$(n+1-1)=" "

```

spaces, denoted by dots, followed by a 'd':

All in a hott and copper sky
d^

and then press ENTER. The character above the 'd' will be deleted when the file is re-displayed; in this case the second 't' is deleted. Each of the sub-edit options is performed in much the same way. These are now described.

It is possible to delete a whole string of characters from a component by typing a set of consecutive 'd's. The words 'planks did swell' will be deleted from the following text:-

And all the planks did swell;
dddddddddd^

To insert text in a component the cursor is again positioned relative to the reference point. An 'i' is placed underneath the character in front of which new text is to be inserted. For instance the words 'boards did shrink' will be inserted to the right of the semi-colon in the following text:

And all the ;
boards did shrink^

Inserting text is the default for sub-edit commands. For example:

And all the ;
boards did shrink^

would have the same effect. The only exceptions to this are if the first character to be inserted is a 'd', 'i' or an 'r'. In these cases the initial 'i' is then obligatory.

Text of equal length can be replaced character-for-character by placing the cursor underneath the first character to be replaced and typing an 'r'. The replacing text is then typed before pressing ENTER. In the following example the word 'below' is replaced by the word 'above':

Right up below the mast did stand.
rabove^

A more usual requirement is to replace text of unequal lengths. This can of course be performed as two separate operations, viz, first be deleting the old text and then by inserting the new (or vice-versa). However, it is possible to achieve this in one operation. The text to be replaced is first deleted, as described above, but before pressing ENTER an 'i' is typed followed by the replacing text. For example, the words 'Not much larger' are replaced by the words 'No bigger' in the following text:

Not much larger than the moon.
 ddddddddddddiNo bigger^

Sub-edits are performed for each component of the current field. If a particular component requires no edit then simply press ENTER. The cursor will move to the

start of the next component. Once the last component has been edited and ENTER pressed the current field will be displayed in its edited form. The field in this new form can be edited again by pressing ENTER and performing another set of sub-edits.

This process can be repeated any number of times until the full text of the current field is correct. The numeric key 1 is then pressed to move to the next textual field in the record. Larger jumps of from two to 10 fields can be made relative to the current field by pressing the appropriate numeric key. To skip 10 fields use key 0. ArchEd considers the last field in the current record to be followed by the first field of the same record. As such the fields are arranged clockwise in a circle. Clockwise is synonymous with positive progress around the fields. Pressing a numeric key that would skip beyond the last field will give a new current field at an appropriate number of fields from the beginning of the record. For example:

Numbered fields on record = 12; current field = 10th; press 5; current field becomes 3rd. (If the third field is numeric the next textual field becomes the current field).

Similarly, pressing a SHIFTeD/Key will move ArchEd anti-clockwise, with the last field following the first. This is the negative direction, and a SHIFTeD numeric is taken to mean minus that number of fields from the current field. Whatever numeric key is pressed, the edits to the current field are accepted and will be applied if the record is updated – see below.

Movement

Movement around the record in either direction can be repeated. During this cycling individual field edits can be 'accepted' any number of times. Once the record is considered to be correct it is ready to be updated.

There are two 'rapid progress' options available which allows you to jump out of sub-editing after any particular sub-edit, to any particular component. Both these facilities are useful once a certain amount of practice and familiarity with ArchEd has been gained. The first option causes immediate re-display of the current field with any sub-edits applied while the second accepts any sub-edits and moves immediately to the next field. A single space is used in the first case and two spaces in the second. To do this, a sub-edit to a component is first completed by pressing ENTER. The cursor will move to the reference point of the next component as normal. If one space (or two, for the second option) is now typed and ENTER pressed, the appropriate action will occur. These options are obviously not applicable if the current field comprises only a single component.

```

let l=1-1
endwhile
let x1$=x$(n to n+1)
print at line,col;x1$
let line=line+q
if a
  w2b2am;p4,x1$
  let p4=p4+1
endif
endwhile
endproc
proc w2b2am;n,x1$
if n=1: let m1$=x1$
else : if n=2: let m2$=x1$
else : if n=3: let m3$=x1$
else : if n=4: let m4$=x1$
else : if n=5: let m5$=x1$
else : if n=6: let m6$=x1$
endif : endif : endif
endif : endif : endif
endproc
proc w2cledit;row
local l,m,n,go,e$,v$,w$,r1$,r2$
let p3=0
let n=1
while n<p4
if n=1: let r1$=m1$
else : if n=2: let r1$=m2$
else : if n=3: let r1$=m3$
else : if n=4: let r1$=m4$
else : if n=5: let r1$=m5$
else : if n=6: let r1$=m6$
endif : endif : endif
endif : endif : endif
let m=row+2*n-2
let go=1
while go
input at m,col;e$
let l=len(e$)
if l
if e$<>" " and e$<>" "
w2c2type;e$," d"
if p1: let go=0
if p1>1: let v$=r1$(1 to p1-1)
else : let v$="": endif
let e$=e$(p1 to )
let p2=len(e$)
let l=instr(e$,"1")
if l
let p2=l-1
let e$=e$(l+1 to )
else : let e$="": endif
if len(r1$)<p1+p2: let w$=""
else : let w$=r1$(p1+p2 to ): endif
if l
let p1=255-len(r1$)+p2
if p1<255
let e$=e$(1 to p1)
endif : endif
let r2$=v$+e$+w$
if r2$="": let r2$=" ": endif
w2c3an;n,r2$
else
w2c2type;e$," r"
if p1: let go=0
if p1>1: let v$=r1$(1 to p1-1)
else : let v$="": endif
let e$=e$(p1+1 to )
let p2=len(e$)
if len(r1$)<p1+p2: let w$=""
else : let w$=r1$(p1+p2 to ): endif
let r2$=v$+e$+w$
w2c3an;n,r2$
else
w2c2type;e$," i"
if not p1
let l=1: let p2=len(e$)
if p2=255: let p2=254: endif
while l<=p2
if e$(l)=" ": let l=l+1
else : let p1=l: let e$="i"+e$(1 to p2): let l=p2+1: endif
endwhile
endif
if p1: let go=0
if p1>1: let v$=r1$(1 to p1-1)
else : let v$="": endif
let e$=e$(p1+1 to )
if len(r1$)<p1: let w$=""
else : let w$=r1$(p1 to ): endif
let p1=255-len(r1$)
let e$=e$(1 to p1)
let r2$=v$+e$+w$
w2c3an;n,r2$
endif : endif : endif
else
let go=0: let n=p4
if e$=" ": let p3=1: endif
endif
else

```



```

        endif
    endwhile
    let n=n+1
endwhile
endproc
proc w2c2type;x1$,x2$
    let p1=instr(x1$,x2$)
    if p1: let p1=p1+2: return : endif
    if x1$(1)=x2$(3): let p1=1: return : endif
    if x1$(1 to 2)=x2$(2 to 3): let p1=2: return : endif
    let p1=0
endproc
proc w2c3an;n,x1$
    if n=1: let n1$=x1$
    else : if n=2: let n2$=x1$
        else : if n=3: let n3$=x1$
            else : if n=4: let n4$=x1$
                else : if n=5: let n5$=x1$
                    else : if n=6: let n6$=x1$
                        endif : endif : endif
                    endif : endif : endif
                endif : endif : endif
            endif : endif : endif
        endif : endif : endif
    endif : endif : endif
endproc
proc w2d1as
    local n,k
    if len(n1$): let m1$=n1$: endif
    if len(n2$): let m2$=n2$: endif
    if len(n3$): let m3$=n3$: endif
    if len(n4$): let m4$=n4$: endif
    if len(n5$): let m5$=n5$: endif
    if len(n6$): let m6$=n6$: endif
    let k=255
    let p2=len(m1$)
    if p2<k
        let p1=p2+len(m2$)
        if p1<k
            let p2=p1
            let p1=p2+len(m3$)
            if p1<k
                let p2=p1
                let p1=p2+len(m4$)
                if p1<k
                    let p2=p1
                    let p1=p2+len(m5$)
                    if p1<k
                        let p2=p1
                        let p1=p2+len(m6$)
                        if p1<k
                            let s$=m1$+m2$+m3$+m4$+m5$+m6$
                            else : let s$=m1$+m2$+m3$+m4$+m5$+m6$(1 to k-p2)
                                endif
                            else : let s$=m1$+m2$+m3$+m4$+m5$(1 to k-p2)
                                endif
                            else : let s$=m1$+m2$+m3$+m4$(1 to k-p2)
                                endif
                            else : let s$=m1$+m2$+m3$
                                endif
                            else : let s$=m1$+m2$+m3$(1 to k-p2)
                                endif
                            else : let s$=m1$+m2$(1 to k-p2)
                                endif
                            else : let s$=m1$
                                endif
                        endif
                    endif
                endif
            endif
        endif
    endif
endproc
proc w2e1zm
    let m1$="": let m2$="": let m3$="
    let m4$="": let m5$="": let m6$="
endproc
proc w2f1zn
    let n1$="": let n2$="": let n3$="
    let n4$="": let n5$="": let n6$="
endproc
proc w2g1af;n
    if n<3
        if n=1: let field1$=s$
            else : let field2$=s$: endif
        else
            if n=3: let field3$=s$
            else : let field4$=s$: endif
        endif
    endif
endproc
proc w2g2af;n
    if n<4
        if n=0: let Title$=s$: endif
        if n=1: let Fname$=s$: endif
        if n=2: let Sname$=s$: endif
        if n=3: let Surname$=s$: endif
        else : if n<9
            rem n=4 'Num', omitted numeric field.
            if n=5: let House$=s$: endif
            if n=6: let Street$=s$: endif
            if n=7: let Town$=s$: endif
            if n=8: let County$=s$: endif
            else
                if n=9: let Post$=s$: endif
                if n=10: let Country$=s$: endif
                rem n=11 'Index', another numeric field.
                if n=12: let Phone$=s$: endif
                if n=13: let Key$=s$: endif
            endif : endif
        endif
    endif
endproc

```

A 'quit' function is provided by pressing key F4 which abandons all the edits performed for all the fields of the current records during this editing phase. This would normally only be chosen if it was suddenly realised that the wrong record was being edited. A record is updated (ie the edits committed) if key F5 is pressed between field edits. A quit or an update causes a return to be made to the record selection process.

A few words of caution are now given, both on the use of ArchEd and the subsequent use put to an 'ArchEd' edited file.

1. There are two instances in procedure w2b1disp where an unrecoverable 'string subscript' error (Error 77) can occur, causing ArchEd to fail. Both these errors arise when the procedure is performing a backward search along the current field to locate a particular character—the first instance involving a search for a space and the second for a non-space. *The error is avoided if fields never contain strings of 48 (or more) consecutive spaces or non-spaces.*

In standard text this is never the case, so this error should never be a problem. If the error occurs processing control immediately passes from the procedure to the standard command level of Archive. All but the last field edit to the current record can be applied if an Archive update command is given immediately. The update must be followed by a 'close' on the file before ArchEd or your own procedures are restarted.

2. It is possible to insert a string of (up to) the full length of the Archive input buffer into the current component. The same is true when replacing text although once the component length has been exceeded the excess replacing text is treated as insertion text. In both these cases any following components, starting with the last, will be pushed off the end of the field to accommodate the inserted text. However, inserting such long strings tends to be impractical since the inserting text tends to obliterate the text of the following components as shown on the tv monitor screen. It is better to insert part of the text, redisplay, and then insert the rest of the text.

3. The Archive 'alter' command restricts field displays to less than screen width in much the same way that sedif fields were originally restricted to screen width. Excess text over-writes the initial text of an 'alter' field and it is almost impossible to assess how CTRL<- or CTRL<-> changes affect the field data. It is therefore better not to use 'alter' on ArchEd edited files but to use only your own application procedures or ArchEd to make further changes.

The following descriptions can be skipped if you're not interested in the inner workings of the 'ArchEd' Procedures.

The w2 editing procedures have the following structure and function:

1. aled is the controlling procedure for editing an individual record from the file. Two 'while' loops control the presentation

ARCHED

of each field of that record, via a work variables s\$, to two subordinate procedures. The first of these procedures is b1disp, whose task is to split the current field into components and display these on the screen. The second, c1edit, is the heart of ArchEd, and handles the editing of the component strings of the current field. Upon return from a c1edit a call to d1 as sets the value of s\$ to the 'after' images (see 3 and 4 below) resulting from the edit. Upon exit from the inner 'while' loop, and given that a meaningful edit has been applied, s\$ is assigned to the current field by a call to glaf. Dependent upon the type of exit from the outer 'while' loop the current record is updated. Finally, the component strings and s\$ (all global variables) are set to 'null' in order to save space upon exit from Arch Ed.

2. b1disp has two main tasks. These are firstly to split up the current field into component strings and secondly to display them, double-line spaced on the screen. The procedure is also used to display the field following the current field, this time single-line spaced.

3. b2am is called by b1disp to assign the component strings to the six string variables m1\$-m6\$. These variables are the 'before' images of the field. Six other variables, n1\$-n6\$, are used during the editing process as the 'after' images of the field.

4. c1edit controls the editing of an individual field from the current record. Two 'while' loops handle the editing of the com-

ponent strings. The first selects the next component and assigns it to a work string (r\$). The second both validates and actions the sub-edit commands (i/d/r - insert/delete/replace) to the work string. A call to c2type assists in this task. The edited work string is assigned to the appropriate 'after' image variable by a call to c3an.

Convolved

There were a number of problems I encountered while writing these procedures. These mostly stem from the somewhat restrictive nature of Archive's particular dialect of Basic.

Not having array processing at my disposal has lead to some necessarily convoluted techniques to achieve the desired results. These techniques have themselves contributed to the slowness of the procedures in their efforts to perform the edits. Certainly if improvements to Archive Basic were forthcoming from Psion these procedures would undoubtedly benefit both in an increase in speed of operation and a cut-back in the amount of storage they occupy. For instance, the ability to assign a value/string directly back to a particular (non-named) occurrence of a field as in, for example:

'let fieldv(n)=x\$'.

However, this is not a valid assignment

statement in Archive. Examination of the procedures will show the protracted nature of the coding Archive labours through to achieve this simple task.

You'll also notice that I've made no use of the error command. During development I noticed that when such error-governed failures occurred memory used by the error trapped procedures was not fully released for re-use. Designing the procedures based on the error command, to control certain processing, led to a gradual loss of memory - a sort of 'creeping amnesia', one might say. I have therefore outlawed their use in procedures what I've written other than where memory was never likely to be a problem and then only in cases of true fatal error processing.

Having stated these criticisms I do however recognise the restrictions in developing a tool like Archive to suit all requirements and accept that the many facilities within Archive represent terrific value especially when one considers that Archive was bundled in with the QL. Any improvements that were to have come Archive's way given that it was to be continually developed, would no doubt have negated the need for ArchEd; a slicker way of handling text strings would be now (no doubt) have existed.

Hopefully, if you have had any difficulties in using Archive, especially in this area of text handing, then you will turn back to it afresh - armed with ArchEd at your fingertips.

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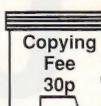
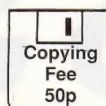
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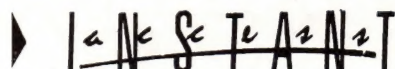
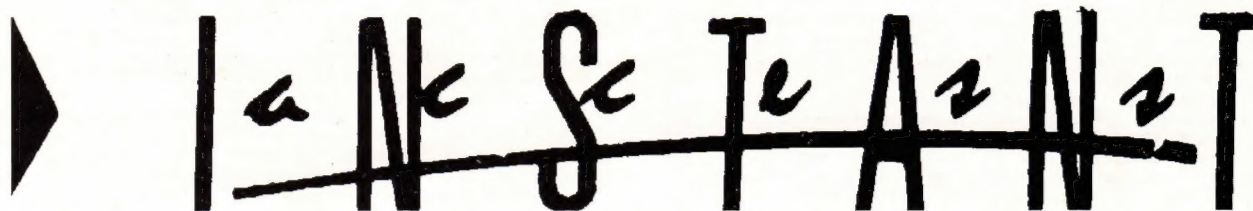
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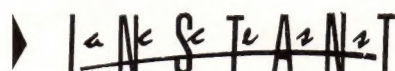
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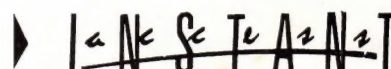
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Compware

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DJW Software

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Eidersoft

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Games utilities, Ice. Pyramide.

ImaQLate Software

42 Albion Street, Broadstairs, Kent CT10 1NE.

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Jochen Merz Software

010 49 203501274

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Lear Data Systems

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Qtris

Liberation Software

081 546 7795

Basic compiler (QLib) and utilities.

QFILE

Apartado 2110 p-1103 Lisboa Codex, MS-Link and Discopy. Portugal.

QL Supersoft

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Qubbesoft PD

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Sector Software

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SD Microsystems

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Software 87

33 Savernake Road, London NW3 2JU
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Talent Software

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TK Computerware

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Add-ons, spares, software.

WD Software

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NEW FROM DIGITAL PRECISION

CPORT BASIC TO C PROGRAM TRANSLATION SYSTEM

This program translates SuperBASIC programs directly into C source code, automatically! If you want to move programs into C for migration to other hardware, or want to get your programs running faster, or simply want to learn C the easy way (chuck BASIC in one end and examine the C that spews out the other), CPORT is the system for you. CPORT is extremely friendly, easy-to-use and tolerant of poorly-written BASIC. There is even a method of dealing with BASIC toolkits. The C it will generate is very readable, human-like and is often optimal. Of course, the better the quality of the BASIC you put in, the better the clarity of the C that will be generated. But don't misunderstand - even if your BASIC is a rats-nest of GOTOs and GOSUBs, CPORT won't mind. Usually, the generated C - which can even be switched between the ANSI and Lattice (K&Rish) industry standards - needs no tinkering with. The only conditions worth mentioning are that there must be no computed branching (e.g. GOTO 3*Y+L), no interpreter-only commands (LIST, EDIT, RENUM etc) and that if the program contains any PROCs or FNs (as it probably will), there mustn't be a GOSUB as well - not restrictions at all. CPORT is an amazing program, making breakthroughs in AI. CPORT is available on its own or together with the acclaimed C68 compiler.

SUPERBASIC MONITOR

Yes - this program monitors and reports on the performance of SuperBASIC programs as they run (i.e. dynamically) under the interpreter. Even if you only occasionally tinker, this one you must have! Ideal for use with XREF, BETTER BASIC, TURBO etc.

XREF v2.0

An incredibly competent program analyser - structure, the dynamic call hierarchy of procedures/functions, step-ladder report, glossary, warnings, variable usage and so on. Ideal with SUPERBASIC MONITOR, BETTER BASIC, TURBO etc.

QMON v2.05

The ultimate version of Tony Tebby's superb machine-code Monitor. An absolute must for those who really want to know what's going on in the QL. £10 off if you return the old Digital Precision Monitor.

COMPARE

This little gem compares files (data or program) at great speed, and allows shuffles and alignment in auto- and semi-auto mode. You cannot do without it!

MEGA DICTIONARY

If you have over 1.5Mb RAM (Goldcard, some ST/Thor) this is the ultimate PERFECTION PLUS accessory, enabling the best possible spellchecking. It contains approximately 360,000 words, which really says it all. Another attraction of this masterpiece - we will soon be announcing a suite of programs enabling sophisticated user-controlled access to the dictionaries and giving previously unsurpassed power at all sorts of word-handling (crosswords, anagrams, missing letters/groups, properties, all sorts of board and TV games). So get the Mega Dictionary now!

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SPELLCHECKER works with and without PERFECTION. SPELLCHECKER can always spellcheck files - either PERFECTION format or plain ASCII (Quill or text87 export files, for example). If PERFECTION is present, SPELLCHECKER can also selectively (pages/blocks/all) spellcheck the current document, or spell as you type. Peak spellchecking speed is over 35,000 characters per second on Goldcard even with the Mega Dictionary, and a cracking 3 pages per second on ordinary QLs. SPELLCHECKER comes with two ready-made dictionaries (the bigger is for 640K or bigger setups) and a system for creating and maintaining (add/delete/edit/view) user dictionaries. Further, you can spellcheck using 1 or 2 dictionaries - typically a supplied one and a user one - you can even specify which is to be used first when checking! So if you bought PERFECTION without SPELLCHECKER and now want to add it, or even if you do not have PERFECTION at all, this is the product for you!

QMATHS MATHEMATICAL SYSTEM

An incredible mathematical compendium for the QL. Pride of place goes to the symbolic problem solver.... It can solve problems, simplify expressions, factorise, expand etc etc - all symbolically! If you could sneak this one into a maths examination (school/GCSE/O/A/S/undergraduate) you would have a formidable ally. It knows about all the algebraic operators, powers, roots, brackets (any number), trigonometry, matrices, determinants, vectors, factorials, perms and combs, binomials, exponentials, logarithms, hyperbolics, inverse functions, infinite series and their approximations,

complex and imaginary numbers, conversions, and even calculus - both differential and integral (even knows definite integration, integration by parts etc)! And when the program is working something out, you can opt to get it to display some or all of the steps either All this is accompanied by a superb interactive tutorial. So whether you have been terrified of maths or are a boffin, this is the program for you: no mathematical skills are assumed or needed. Whether all you want to do is compute $2+2$ or $d/dx((\sin(x)+x.\log(x))^{(x^{(g(x)))})}$, QMATHS will do it. There is nothing like this available on any computer. In addition to this program, the package also contains an interpretive, fractal image-generating language with loads of beautiful fractal programs supplied for you to use, modify or adapt. No programming skill is assumed or needed. In addition, there is a multiple precision floating point maths package - allowing calculations with all the QL functions at precisions up to over 600 decimal digit accuracy (that is not a misprint) and very fast too. In addition, there is a 3D surface modelling program and lots of calculating routines to perform all sorts of algebraic and statistical computations in your own BASIC or Abacus systems. This is an incredible package.

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